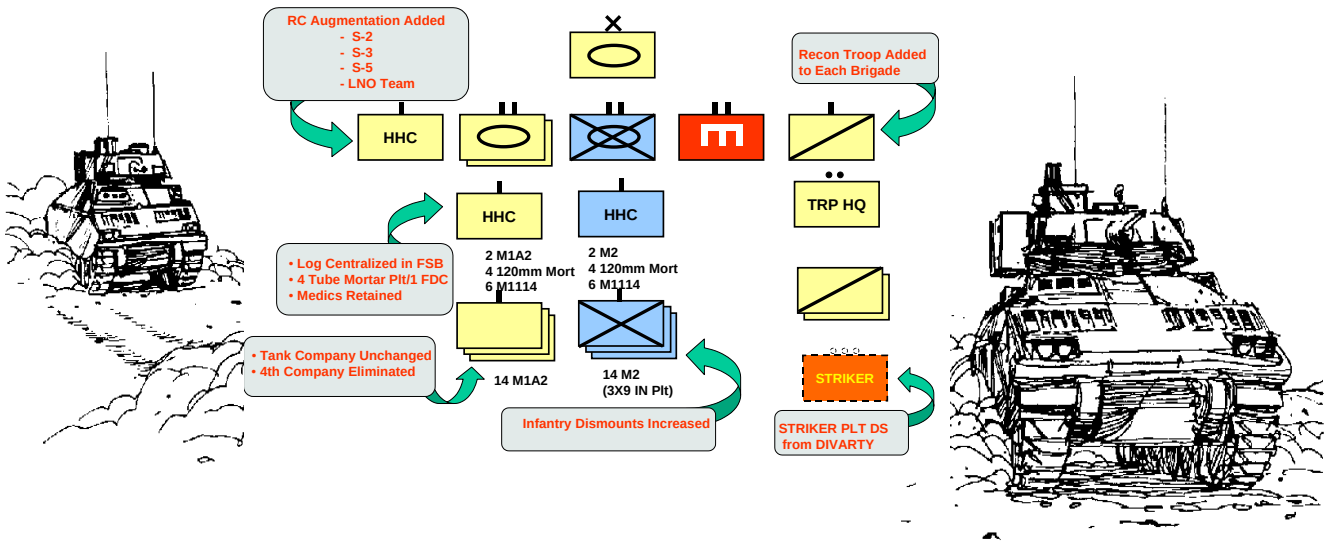
NEWSLETTER

No. 00-1 **JAN 00**

First LOOk!

Force XXI Combat Engineers and the *Engineer-Bradley Fighting Vehicle (E-BFV)*



CENTER FOR ARMY LESSONS LEARNED (CALL)
U. S. ARMY TRAINING AND DOCTRINE COMMAND (TRADOC)
FORT LEAVENWORTH, KS 66027-1350

FOREWORD

With the reduction of armored and mechanized infantry battalions to three companies, the engineers of the Force XXI organization have an increased combat role. Rotation 98-10 at the National Training Center provided an opportunity to observe the Force XXI "enablers" that are intended to aid the new combat engineers. The Engineer-Bradley Fighting Vehicle (E-BFV) is one enabler for significantly improving the combat capability of the engineer force. This newsletter examines the E-BFV and how it can help fill the combat power vacuum that is created with the loss of the fourth maneuver company.

A team of subject matter experts observed the Force XXI combat engineer during Rotation 98-10 and wrote the observations and tactics, techniques, and procedures (TTP) presented in this newsletter. They discuss the role of Force XXI combat engineers in conducting offensive and defensive missions alongside maneuver units. They also look at equipment and training requirements and manning issues for the Bradley Engineer Platoon, and discuss the challenges of casualty evacuation for the new E-BFV companies.

I invite you to look at the lessons and TTP. The information is valuable not only to the engineers of the future, but also to the maneuver and support units as The Army evolves to the smaller, lighter, more mobile, lethal, and technologically superior Force XXI.

MICHAEL A. HIEMSTRA
COL, FA
Director, Center for Army Lessons Learned

FIRST LOOK
Force XXI Combat Engineers and the Engineer-Bradley Fighting Vehicle (E-BFV)

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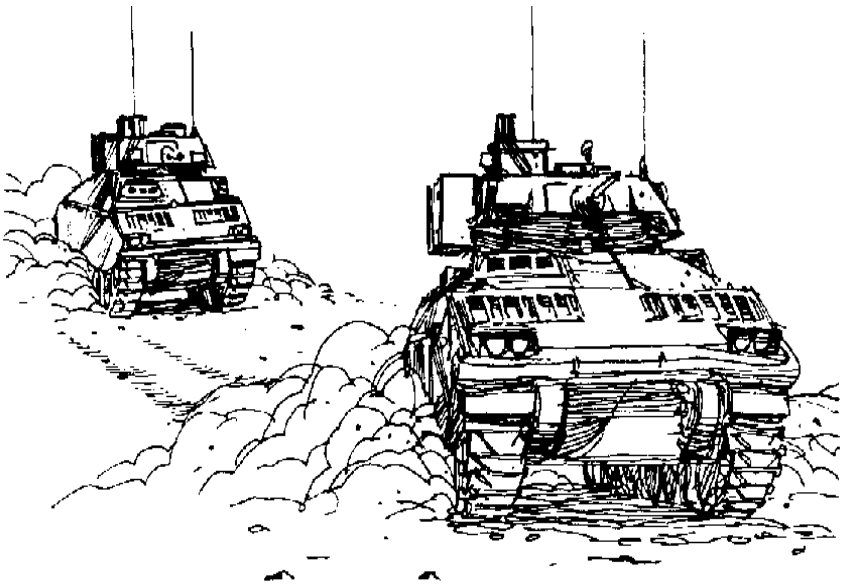


INTRODUCTION: NTC Rotation No. 98-10

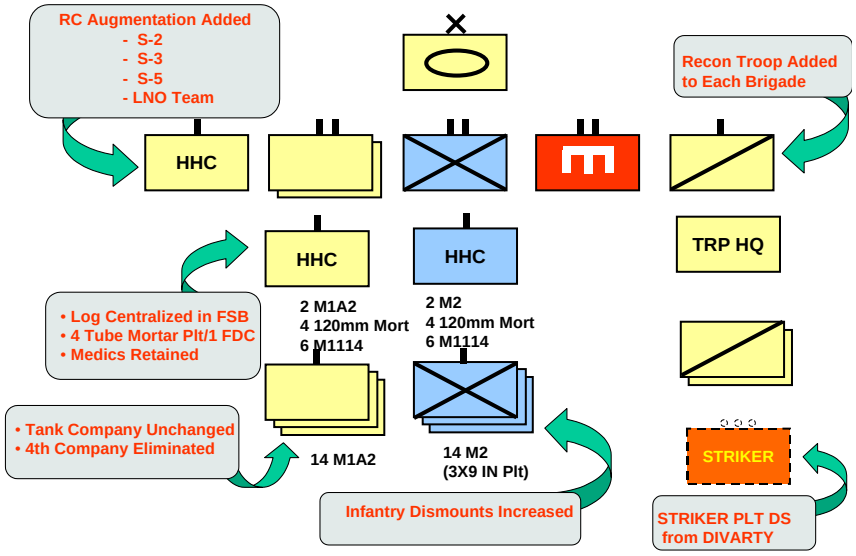
As our Army transitions to the new Limited Conversion Heavy Division design, several issues are beginning to surface. One issue in particular is the decrease in size and equipment of armor and mechanized infantry battalions from four line companies to three -- from 58 combat vehicles to 45. During Rotation No. 98-10 at the National Training Center (NTC), the Center for Army Lessons Learned (CALL) had the opportunity to observe one of these new three-company battalions for the first time.

NTC's Rotation No. 98-10 provided CALL an opportunity to observe some of the Force XXI *enablers* that will highlight the new organizational model. One improvement, the new Engineer-Bradley Fighting Vehicle (E-BFV), for example, is expected to significantly improve the combat capability of the engineer force. This newsletter examines the role of the E-BFV and how it can help to fill the combat power vacuum that is created with the loss of the fourth maneuver company.

This publication also illustrates how increased and improved technological superiority can come to bear at precisely the right time and place on the battlefield. For example, new command, control, communications, and intelligence (C^3I) systems are currently being developed to provide greater situational awareness. The concepts for utilizing and integrating all the new enablers are still under review, and tactics, techniques, and procedures (TTPs) will continue to be developed as new concepts are further refined and new issues emerge during our Army's transition to the conservative Heavy Division.

The battalion observed during Rotation No. 98-10 served under a partially fielded Force XXI aviation brigade. To better understand the concept of the new three-company battalion, some background information on the Force XXI brigade is in order. The Force XXI brigade organization is shown below:

FORCE XXI BRIGADE



Force XXI brigade key points:

● **Fifty-six Reserve Component (RC) soldiers will enhance RC integration by filling key headquarters and headquarters company (HHC) positions, such as augmenting the brigade battle staff.**

● **The HMMWV-equipped Brigade Reconnaissance Troop (BRT) complements the new Division XXI design, giving the brigade commander dedicated eyes on the battlefield.**

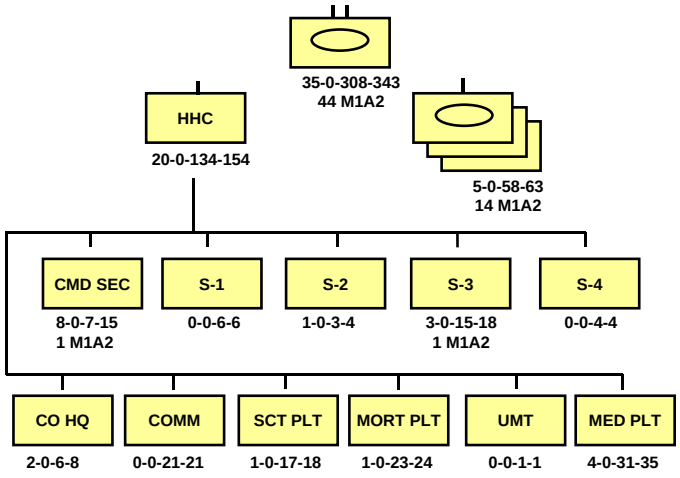
● **The striker platoon is attached to the BRT from the direct support (DS) artillery battalion to provide observation and subsequent attack capabilities on brigade critical targets as well as additional observation and surveillance capabilities.**

● **The bulk of CSS will remain with the FSB commander to create a system that distributes employment by CSS personnel.**

The organization of the new Force XXI maneuver battalion is similar to the Army of Excellence battalion organization, with reductions in personnel and equipment strengths as a result of losing the fourth company. The chart below depicts an armor battalion. In an armor battalion, total tanks will decrease from 58 to 45, with the 45th tank actually serving as a float. The same will hold true for a mechanized infantry battalion -- the total number of Bradley Fighting Vehicles will fall from 58 to 45.

FORCE XXI BATTALION

Force XXI battalion key points:



● **Loss of the fourth tank company on the premise that increased situational awareness will diminish,**
perhaps even negate, the need for flank security or a reserve.

● **The reorganized Scout Platoon reduces the number of active scouts from 10 to 6.**

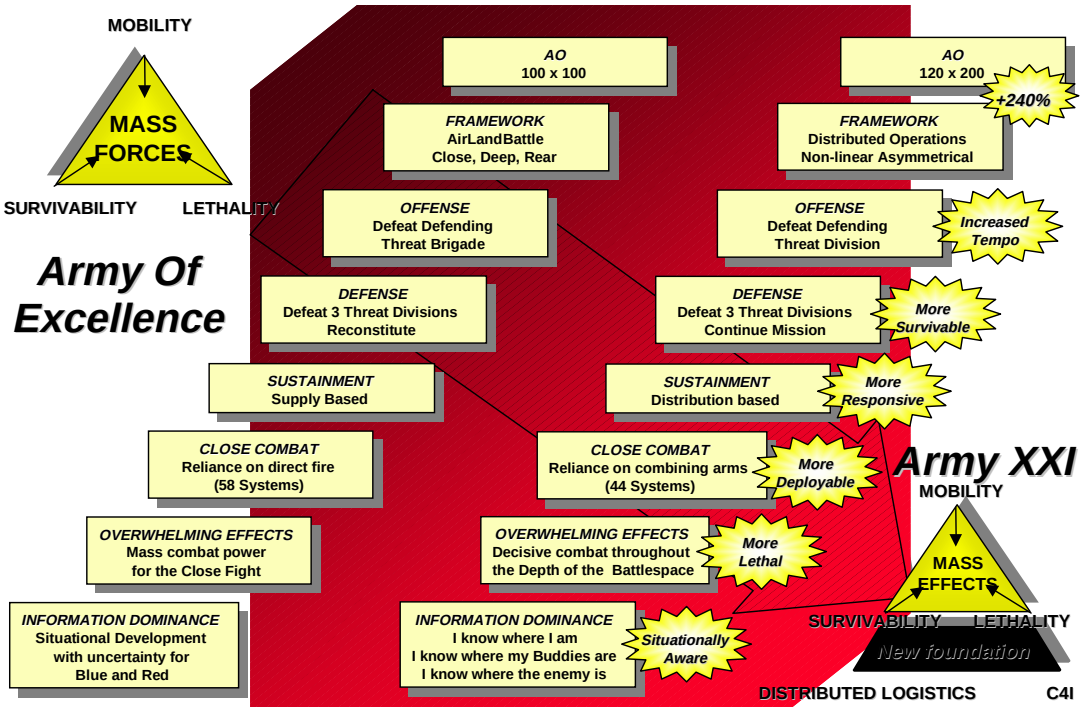
● **In the Mortar Platoon, the number of mortar tubes has decreased from 6 to 4.**

● **Infantry platoons lose their five-man machine gun squad and are now configured into three 9-man squads to enhance MOUT and SASO capabilities.**

We've been here before!

It is interesting to note that the old **FM 71-2, *The Tank and Mechanized Infantry Battalion,*** 30 June 1977, mirrors the three-company battalion espoused in the Force XXI organization. Tank platoons consisted of five tanks manned by 20 personnel, and mechanized infantry platoons consisted of four Armored Personnel Carriers (APCs) and 38 infantrymen. The rifle platoon consisted of a platoon headquarters and three 11-man squads. The scout platoon consisted of a headquarters with two APCs and two scout sections with four APCs each.

The following is a comparison of Army of Excellence (old doctrine) and Army XXI (new concept) characteristics:



Bottom Line:

● **The Force XXI organization will have a larger area of operation in which to maneuver and fight, and will have fewer combat systems available.**

● **Combat units will depend heavily on superior technology to provide enablers that will fill the gap created by fewer combat systems.** These enablers, such as the tactical internet and distributed logistics, will become more important than ever before with the increased operational tempo.

● **A smaller friendly force is still expected to defeat a larger enemy force.** Under the new Army XXI organization, an Army XXI Division is expected to defeat one entire defending threat division, and defeat three attacking threat divisions through superior technology such as:

➤ **Situational awareness gained from the tactical internet.**

➤ **Tempo maintained by sharper situational awareness and distributed logistics.**

➤ **Combination of the effects of combat and CS systems (more MLRS, less Apaches, more RSTA).**

➤ **Ability to fight throughout the depth of the battlefield instead of concentrating on the close fight.**

➤ **Deployability of the force.✪**

CHAPTER 1

Combat Engineers in the Mechanized/Armored Fight

by LTC Dan Wilson, 317th Engineer Battalion

MORE MOBILE, MORE LETHAL

The armored/mechanized force of today is much different from that of the Cold War or even Operation DESERT STORM. Army War Reserve and Prepositioned Afloat equipment allow us to put an armored brigade in our contingency areas in the same amount of time it used to take us to get an airborne brigade there. Fast sea-lift ships allow the heavy division to bring its own equipment to almost anywhere in the world in a matter of days. Upgrades to the Abrams Tank and the Bradley Fighting Vehicle, and the fielding of Paladin, make the heavy force even more mobile and lethal. Today's mechanized infantry divisions pose unprecedented tactical mobility, as well as strategic mobility previously associated only with our airborne forces

Many of us whose engineer troop experience was largely in an Army focused on the defense of Europe (the "General Defense Plan," or "GDP") in the late 70s and 80s, or in light and construction units, are still struggling with how the divisional engineers fit into this force. The debate in the engineer community over the engineer squad vehicle demonstrates this. It is this author's belief that two deceptively simple statements should guide our vision:

1. **We must realize that we fight as platoons now.**
2. **We must strive toward being an armored, rather than a mechanized force.**

PLATOONS, NOT SQUADS

Platoons are our basic fighting units. We fight as platoons in the mechanized force. During the GDP days, the *squad* was the most critical engineer asset, and the basic unit for executing our primary missions. As a company commander in Germany in the early 80s, my platoon leaders had a very minor role in executing our defense in sector. With the exception of a few large, platoon-sized obstacles, squads executed most of our obstacles. The *squad was king,* maneuvering independently around the battlefield executing the obstacle plan. The focus of platoon leaders and platoon sergeants was keeping their squads supplied. Today, in our offensively oriented mechanized force, there are virtually no independent squad missions. A platoon reduces an obstacle. Squads execute parts of that operation using their drills, but it is the platoon that orchestrates squads and equipment crews on the ground to form a lane through an obstacle (and it is largely the crews of specialty vehicles that reduce obstacles, not squads). A platoon lays a row minefield; squads lay a row or put up the marking fence. A platoon sites and marks a Volcano minefield. The squad is still an important building block, but the platoon is now the basic fighting unit of the mechanized Army.

ARMORED, NOT MECHANIZED

Some may disagree with me, but I believe we need to think in terms of *armored* rather than mechanized warfare. In mechanized warfare, soldiers ride to a point on the battlefield in a vehicle, and then dismount to do their job. In armored warfare, soldiers perform their primary mission while remaining mounted under armor. In a highly mobile, offensively oriented force on the lethal battlefield of today and tomorrow, we must be an *armored* engineer force -- not mechanized. Currently, we put our engineer soldiers in the most lightly-armored vehicles in our inventory, drive them to an enemy target reference point (TRP), and then have them dismount and breach an obstacle, totally unprotected from the fires swirling all around them! If we are to ensure the mobility of our armored maneuver forces, and survive the mission, we must be mounted in the most survivable armored vehicles we can get. We must be able to perform our primary missions from *within* these survivable vehicles, while preserving a dismounted capability to help root out determined enemies from their holes or dismantle obstructions

NOW, NOT LATER

What can we do ***today*** to make us a more effective *armored* engineer force? The Bradley, Grizzly and Wolverine systems promised the tools we need to fight as armored engineers, but the Grizzly and Wolverine systems have been cancelled, and the Bradley (or an engineer squad vehicle) is years away from fielding.

"You are not commanding in the 21st century."
BG Joseph Inge, Deputy Commandant, Command and General Staff College,
addressing Pre-Command Course students, 1996

It is now the 21st century. Do we just continue with the status quo? I would hope not, because I believe the status quo serves us poorly *now!* Our organization, equipment, and training focus remain rooted in the old GDP Army. We are not set up for success in today's highly mobile mechanized warfare. What we *can* do is make immediate improvements that will make us more effective ***today,*** and better prepare us to incorporate our forthcoming armored systems.

M113s, NOT HMMWVs

From the GDP army, combat engineers have developed the idea that platoon sergeants and first sergeants are logisticians, rather than the most experienced warfighters in our units. We mount our platoon sergeants in HMMWVs and give our first sergeants no vehicle at all, effectively taking them out of the close fight. As a consequence, command and control of our units suffer, particularly in offensive operations.

Our engineer MTOE provides no vehicle at all for our first sergeants. Of course, every first sergeant quickly takes the A&O platoon sergeant's HMMWV, relegating the platoon sergeant to a 5-ton truck. A HMMWV is fine for the many errands first sergeants do while running down problems during the preparation for combat, but it effectively prevents them from influencing the execution of the fight. History is full of examples of company first sergeants rallying units and turning the tide of battles. We need to give these experienced soldiers a survivable vehicle that gets them into the fight, rather than one that forces them to follow at a safe distance. Infantry first sergeants have M113s; tank company first sergeants have M113s; ***engineer first sergeants need M113s.***

An engineer platoon organized to breach a complex obstacle typically controls eight to ten vehicles: four engineer M113s, one AVLM, one AVLB, one or two M1s with plows, and one or two ACEs. We place this large force under the command of our most junior officer, and ask him to maneuver it by himself into the most difficult operation we undertake while his platoon sergeant waits a safe distance behind. (Could this be why "poor command and control of engineer assets at the breach" is a frequent AAR comment at our training centers?) *We must get the most experienced soldier in the platoon* **into the fight!** Platoon sergeants need to be mounted in an armored vehicle and go forward with the platoon leader to help him maneuver the platoon and accomplish the breach. Infantry platoon sergeants are in Bradleys; tank platoon sergeants are in tanks; **engineer platoon sergeants need to be in M113s** -- (until we get Bradleys, when he must be in a Bradley).

Of course, putting platoon sergeants in M113s/Bradleys means either two squads or three smaller squads are carried across four vehicles. This is not a problem if you have made the leap from the old GDP focus on squad strength and integrity to the idea of platoons fighting mounted. The tremendous increase in command and control and the ability to maneuver our critical mechanical assets is well worth the minor reduction in dismounted strength.

BRING ON THE BRADLEYS!

Those who argue against mounting engineers in Bradleys usually cite concern over the loss of room to carry tools and a "full" squad of nine in a Bradley, because all our drills are written for six dismounts. Could it be, perhaps, as we think armored warfare and mounted breach, that our *drills* are out of date? Bradleys will restore us as fully capable members of the ground maneuver team, rather than lightly armed vulnerable specialists who must be escorted to our job sites by "more capable" infantrymen or tankers. Wouldn't it be great if an engineer company could be the *breach* force, rather than just the *reduction* force? This will be especially important when infantry and armor battalions lose a company. These smaller maneuver battalions will not be able to give up combat power to escort engineers around the battlefield. We must be survivable, lethal and capable of maneuvering ourselves across the battlefield, and we must be mounted in Bradleys and fully trained in its systems.

VOLCANO PLATOON NEEDED

Volcano is our most powerful weapon system. Accurate, flexible, and lethal, it should be the obstacle of choice on the modern armored battlefield. Our current organization and doctrine do not allow us to take full advantage of this powerful weapon. We currently assign the Volcano as yet another specialty piece of equipment in the A&O platoon -- which has six different kinds of vehicles. For crew, we assign two SPC/PFCs. There is no section NCO, just two more vehicles in a very large platoon. This for a weapon system that must have the Brigade, Division, or even Corps Commander's permission to fire!

During *defensive* operations, the engineer company commander can assign his Volcanos to his platoon leaders or senior NCOs to control. In fact, the primary duty of an engineer platoon in the defense might be the employment of a Volcano if no conventional obstacles are being used. During *offensive* operations, however, the company commander and his platoon leaders are focused on the breach. The company does not have the planning or command and control resources required to effectively employ Volcano in the offense.

Using our GPS equipment, we should be able to navigate accurately to planned obstacle locations, and, by driving in different formations, simultaneously emplace entire groups of Volcano minefields without ever stopping

and without any need to mark centerlines. An ad hoc "Team Volcano" will not be able to execute such a complex maneuver. **We should pull the Volcanos into a platoon at battalion level, with a dedicated platoon leader, a platoon sergeant, and section sergeants.** The engineer battalion has the planning resources to effectively get Volcano into the offense, and a dedicated Volcano Platoon can develop real expertise and unlock the full potential of this weapon system.

We must also fix our doctrine on the release authority for long duration Volcano. Why is it that I can, without anyone's permission, put in a conventional minefield that *never goes away*, yet I must get the Corps Commander's permission to put in one that will *self-destruct* in a few days? Isn't that backwards? We should require long duration minefields behind the FLOT to be marked just like conventional minefields, and give release authority to Brigade Commanders. Any further restrictions could be imposed as needed using obstacle zone and belt restrictions.

ENGINEER SCOUTS FOR ENGINEER RECONNAISSANCE

Authors have been writing for years about the need for better engineer reconnaissance, notably Mr. Michael Sayer of the National Training Center (***Engineer***). Maneuver scouts, Combat Observation Lasing Teams (COLTs), and aerial reconnaissance units are force-oriented. They are not usually trained to provide the sort of detailed obstacle information required to plan a deliberate breach, nor to answer such intelligence requirements as the suitability and trafficability of routes and bridges. Engineers are best suited to answer these intelligence needs -- but engineers have no dedicated reconnaissance assets. Units have tried several different solutions to this problem, but I agree with Mr. Sayer that only **a dedicated and specially trained platoon under engineer battalion control** can perform this mission well.

Placing platoon sergeants in M113s frees up six HMMWVs in the battalion that can form the basis for a reconnaissance platoon. This platoon would provide the engineer battalion commander and maneuver brigade commander with a specially trained, dedicated unit to accomplish critical and often overlooked mobility aspects of the brigade reconnaissance plan, without diverting critical engineer platoons.

ONE ENGINEER BATTALION'S SOLUTION

The 317th Engineer Battalion created both a Scout Platoon and a Volcano Platoon, mounted our platoon sergeants in combat vehicles, and provided manning for such important but unsupported positions as track commanders for the battalion, company commanders and platoon leaders.

How We Did It!

1. We created the units with a relatively simple reorganization of our existing assets and with no loss of capability in our engineer platoons (total reduction in dismounted strength in each platoon is only two soldiers).

2. We took the HMMWVs out of our engineer platoons and mounted the platoon sergeant in the 3d Squad's M113.

3. Our four-M113 engineer platoons maneuvered using the same techniques as the old M113 infantry platoons, with the platoon sergeant an integral part of platoon maneuver. This ensures the most experienced soldier in the platoon is in position to fight and survive, greatly increasing the effectiveness of the platoon.

4. We had the advantage in our battalion of having excess M113s for our first sergeants, providing this key leader the same mobility and survivability his infantry and armor counterparts enjoy.

5. We designated some of the NCOs from the 3d Squad as track commanders (TCs) for our company commanders and platoon leaders, freeing the latter to concentrate on fighting their units while the TC fights their vehicle. Command and control of engineers, particularly during offensive operations, is greatly improved.

6. The six platoon HMMWVs provide the transportation for the battalion Scout Platoon. The platoon is specially trained and organized to perform engineer reconnaissance, and provides a level of expertise that can only be achieved by a dedicated force. The platoon can operate as a unit under engineer battalion control to answer engineer priority intelligence requirements for the engineer battalion and maneuver brigade. It can also provide squads, or operate in two sections under task force control with task force scout platoons as part of task force reconnaissance and surveillance plans.

7. We consolidated our six M548s and Volcano systems, and three HEMMTs into a battalion Volcano Platoon. The platoon can operate as a unit to emplace dynamic obstacle groups, or as squads under task force control in a more traditional role.

   a. The HEMMTs carry reloads, and provide ready vehicles to transfer the Volcano should one of the primary carriers develop a maintenance problem.

   b. HMMWVs for the platoon leader and platoon sergeant are diverted from three heavy HMMWVs added to our Support Platoon in the FY 99 Modified Table of Organization and Equipment.

   c. This organization provides dedicated NCO leadership over these critical weapon systems, and a platoon leader and platoon sergeant dedicated to developing true expertise in Volcano employment.

The 588th Engineer Battalion enjoyed great success at NTC with their Volcano Platoon, getting Volcano into the fight on every mission. We plan to build on their success, further refining the tactics and techniques for the platoon and get this powerful weapon into the fight.

CONCLUSION

The 317th Engineer Battalion found that organizing *now* as a mounted, fighting force requires no additional equipment or personnel. By rearranging existing assets and changing the training focus of subordinate units, the battalion was able to create dedicated, expert reconnaissance and Volcano units and get the most experienced soldiers into the fight. We believe a similar reorganization across all Army engineer units *now* would enable us to better support today's mechanized battle, and better prepare us for the armored engineer warfare of tomorrow.✪

CHAPTER 2

OBSERVATIONS ON FORCE XXI and the THREE-COMPANY BATTALION

by MAJ Michael Albertson, Center for Army Lessons Learned

Flexibility of the new three-company battalion.

During NTC Rotation No. 98-10, the 45-tank armor battalion did not provide the brigade or battalion commanders with an agile and flexible force. The unit lost flexibility once committed. The commander had a limited ability to designate a reserve/counterattack force (especially when facing a strong enemy. The three-company organization limited forms and techniques of maneuver (i.e., line, column, vee, and wedge).

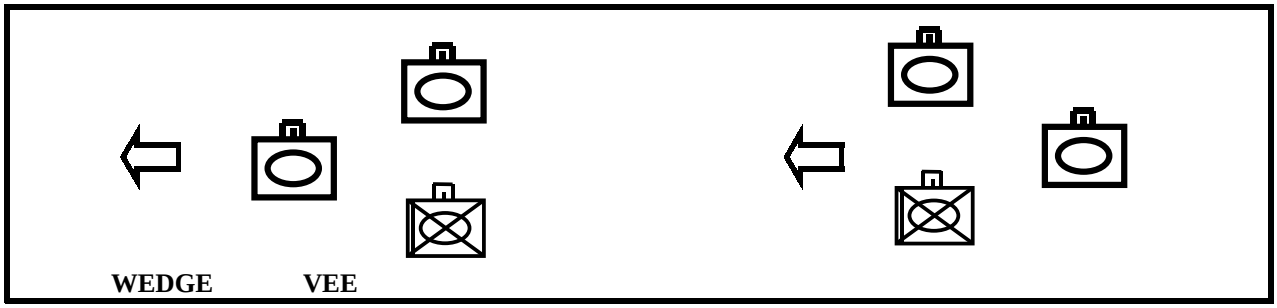
★★★

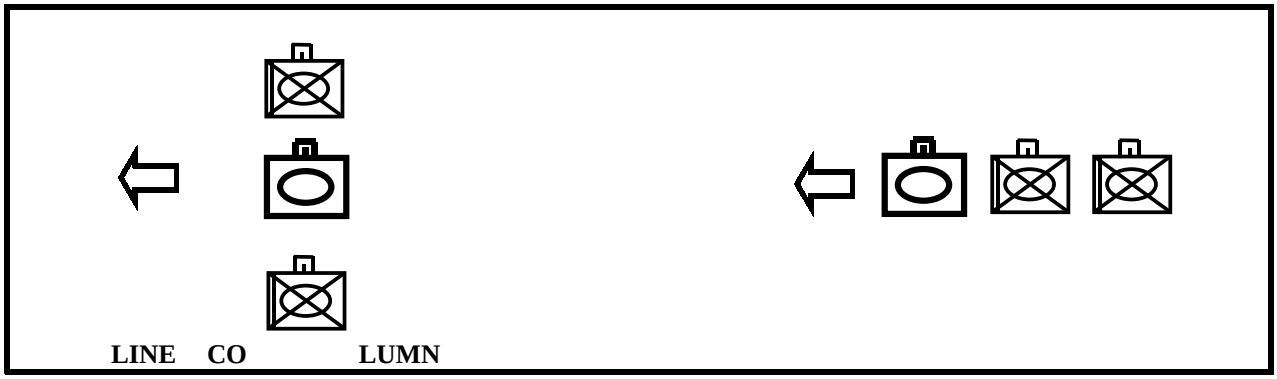
Observation No. 1: **The three-company organization does not allow the task force commander to effectively use a company/team as a reserve/counterattack force.**

Discussion: The TF commander used a pure tank company (C Co) as a reserve. As a result, the battalion could fight with only two company/teams forward, which did not allow the battalion to mass as much combat power forward. The TF commander task-organized as follows:

MANEUVER	**RESERVE**
A TANK	***C TANK***
1/A (Tank)	1/C (Tank)
2/A (Tank)	2/C (Tank)
3/B (Mech)	3/C (Tank)
B MECH	
1/B (Mech)	
2/B (Mech)	
3/A (Tank)	

If a company/team is used as a reserve, there is less mass forward, and, therefore, less lateral distance can be covered by the two forward company/teams. With the Armor TF now having three company/teams, each company/team must be more highly trained, flexible, mobile and agile than the previous four-company/team organization. The pictures on page 2-2 depict how the TF now has four basic movement formations: Wedge, Line, Vee, or Column.





If a TF commander designates a company/team as a reserve, he neutralizes one third of his combat power. The commander also has the option of designating a platoon as the TF reserve. But the commander of an Army XXI battalion must now carefully weigh the decisive factor one platoon may have versus the degradation that one company will feel as that unit's combat power is cut by a third.

The formation that maximizes mass forward and still retains flexibility is the TF vee.

The formation that maximizes flexibility and retains mass is the TF wedge.

A company/team frontage in the attack varies from 500 to 1,500 meters (METT-TC dependent). Assuming a TF commander uses a company/team as a reserve, TF frontage is now between 1,000 and 3,000 meters. Previously, with four company/teams (one in reserve), the frontage of three forward, one back was 1,500 to 4,500 meters. This is a loss of 500 to 1,500 meters. Across a brigade front, this adds up to 1,500 to 4,500 meters of lost coverage.

In the Army After Next (AAN), it is anticipated that this lost coverage will be made up with improved technologies of the M1A2, M2A3, and the Future Scout and Cavalry System (FSCS). In the Force XXI Army, company/teams must make up that space with enhanced training and flexibility. Tactics, techniques, and procedures that incorporate the new technologies will be the key to becoming more flexible.

RECOMMENDATIONS:

1. Reduce the doctrinal frontage for a task force until the enablers that provide greater situational awareness at the battalion are fielded and integrated.

2. Task-organize the brigade so that one or more task forces has four company/teams, thus making the brigade reserve smaller.

3. The company/teams under the new Army XXI framework must demonstrate battle drill proficiency. Company/team battle drills must be well-rehearsed to work well in a friction-filled environment. The ability to transition quickly and effectively from movement to maneuver is essential.

★★★

Observation No. 2: **Because attachments and cross attachments will be more prevalent under the new organization, a system for coordinating and exchanging "single page" SOPs should be developed.**

Discussion: A company/team commander must know the capabilities of his attachments and his attachments must know where they fit in the big picture. If each has a concise method for articulating their capabilities, limitations, and general tactical employment, combat multipliers can contribute much more to the mission.

Many observer/controllers at the NTC have commented that combat multipliers are attached to company/teams too late in the planning and preparation phases of missions for them to be used to their full potential during the execution phase. It has often been noted that even if "attachments" do conduct an early linkup with their controlling organization, time is still not available to make them feel like "one of the team."

Because of the pace of operations during a rotation at the NTC, attachments are often forgotten and not thought about again until the after-action review (AAR) is conducted following the mission. Attachments are often not linked up with the unit they are tasked to support until *after* the planning and orders processes and the rehearsal for that mission have been conducted. The result is a company commander who is not aware of the capabilities the supporting attached units can provide and, therefore, does not adequately plan for them in the mission. The frequent end result is attached units moving under the control of the first sergeant with the combat trains, contributing little to the mission.

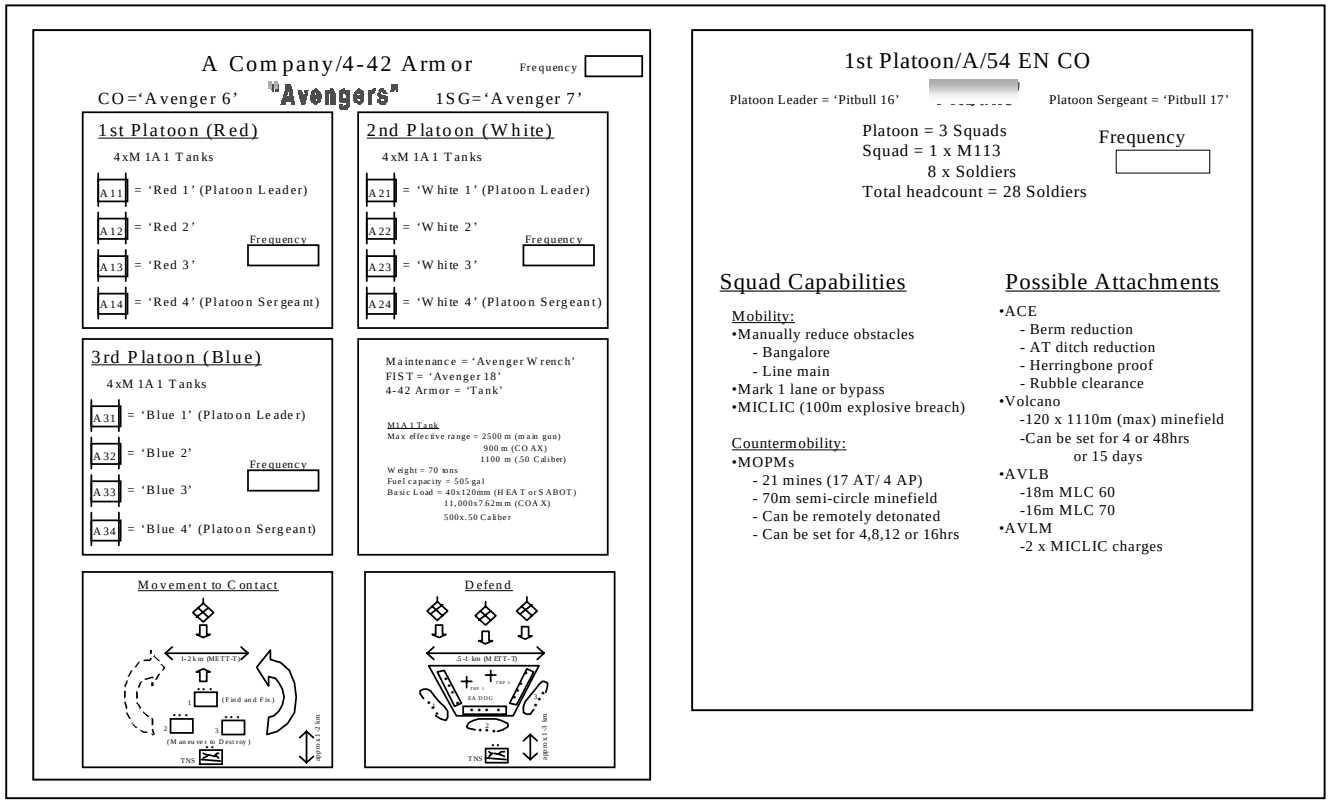
Because of either time mismanagement by higher headquarters or the time-constrained environment, the amount of planning time at the company/team level is often limited. The commander must think about the tactical employment of his company, formulate a plan, and articulate it to his company in the very short amount of time he has. Additionally, he must integrate his fire support team (FIST) into his plan. What if the task force receives additional assets from the brigade combat team (BCT) and gives them to his company/team during his planning process? He made no prior coordination, and most likely the attachments will not find his assembly area (AA) until after the operations order. Often, the attachment finds the company/team as they cross the LD.

What can assist the company/team commander in planning for and integrating his combat multipliers? Because the commander has no staff to help him with his military decision-making process (MDMP), he must rely on his expertise and that of his attachments.

RECOMMENDATIONS:

1. The company commander and his attachment should exchange one-page consolidated SOPs, reference cards, or information cards, which contain each other's capabilities, call signs, concerns, and other pertinent information. The following is "a way" of accomplishing this.

A company/team commander is planning his operations order and an engineer platoon leader arrives, attached by the task force to the company/team. The commander will issue his order in 30 minutes. The commander and the engineer platoon leader exchange the following one-page consolidated SOPs:



2. In this example, the commander is able to effectively plan for, and integrate, the engineer platoon in his order and the engineer platoon leader knows the company/team organization and general method of employment along with frequencies and call signs. This method was used effectively by units at the National Training Center, and can be used by commanders as a starting point for integrating combat multipliers. This method will work best when brigade level or higher directs all units to construct such consolidated SOPs.

Decreased Combat Power.

Observation No. 1: **Under the new Army XXI framework, the combat power of a task force is cut 25 percent, reducing its ability to mass fires and conduct security operations accordingly.**

Discussion: The principles of war that are affected by a cut in task force combat power are mass, security, and economy of force (Chapter 2, **FM 100-5,** ***Operations***).

a. Mass is affected in the sense that there is inherently less firepower available in the task force. Additionally, it is more difficult to mass the effects of all weapons systems when the company/teams are more widely distributed across the battlefield.

b. It is more difficult to secure the task force with three company/teams. With less assets available, it is harder to secure the TOC, provide a tactical combat force (TCF) for the brigade combat team (BCT), and secure the task force or brigade flanks.

c. Economy-of-force missions are now more difficult to conduct. If a company/team is tasked to perform an economy-of-force mission, it takes away one third of the combat power of the task force.

Task force commanders must be judicious and will be required to accept tactical risk when assigning company/team missions that will take away from mass and firepower. With only three companies, the brigade may choose the division cavalry squadron to conduct the live-fire breach mission. This is because a cavalry squadron now possesses more combat power than any task force in the division. The cavalry squadron may become the force of choice for difficult missions, such as deliberate attack of an enemy strongpoint.

★★★

Observation No. 2: **Combat power is significantly affected by the unit's maintenance posture.**

Discussion: With fewer combat vehicles available to the battalion, the battalion must have fewer vehicles down for maintenance to maintain a 90-percent operational readiness rate. For example, the loss of five tanks to a 58-tank battalion is a decrease in combat power of 8.5 percent. However, the loss of five tanks to a 45-tank battalion is a decrease in combat power of 12.5 percent.

This implies that the maintenance system must be improved sufficiently to counter the impact of fewer vehicles. Vehicles must break less often and must be fixed more quickly. Unfortunately, because company/teams may be required to cover more ground, they could travel greater distances. This will increase the wear and tear on combat vehicles, making them more prone to breaking down. If the rotational operational ready rates are indicative of rates the force will experience during sustained combat operations, the smaller battalion will experience comparably lower combat power rates.

RECOMMENDATIONS:

1. Re-engineer the parts logistics system. Make it a customer-oriented process whereby units get parts they need as quickly as possible (easier said than done).
2. Ensure all vehicle commanders and operators are truly a "T" at their unit-level maintenance (ULM) programs emphasizing PMCS.

Intelligence.

Observation No. 1: **During this rotation, it was observed that the brigade did not have enough of the right types of personnel to adequately enable the new technology to enhance the combat capability of the battalion.** The S2 section only worked with two officers. Information that flows into the S2 section can originate from at least 20 different sources. Information overload occured whenever contact with the enemy was made. The increased number of collection assets did not result in an increase in intelligence. This was primarily because of the lack of experience and insufficient manning of the S2 section.

★★★

Observation No. 2: **The reorganized scout platoon reduces the number of scouts from ten to six.** This degrades the task force's reconnaissance and surveillance (R&S) plan, with fewer assets covering more battle space. This also makes it more difficult for a task force to concentrate a smaller force at the decisive point.

★★★

Observation No. 3: **The new technology had a tendancy to paralyze, rather than to liberate a battle staff.** When a "perfect" enemy picture is attainable, the thinking that predominated was to "wait" for a perfect read of the enemy disposition, rather than act on a good one. The MDMP was observed to slow as a result, rather than to accelerate, until a perfect read of the enemy was available. The battle staff became focused on JSTARS and UAV feeds. In some cases, ASAS and other conventional sources, such as MISTY FAC, appeared to be delivering a better read of the enemy disposition, and the Canadian reconnaissance platoon was providing a better and more relevant enemy picture. These sources were often ignored, however, while the battle staff based its decisions on JSTARS and the UAV. When these assets were not operating, the brigade was observed to lapse into a state of paralysis.

Battle Command.

Observation No. 1: During this rotation, electronic communication was observed as the lynch pin of the digitized unit. If the Mobile Subscriber Equipment (MSE) capability is lost, units usually find themselves back to the older (but still current for most of our Army) system of FM only.

Discussion: During this rotation, the communication package was not robust, and it failed to provide the redundancy required for a digital and EPLRS network. The brigade also did not possess the experienced personnel needed for robust communication support, and their equipment was insufficient for transmitting reliable or redundant FM, TACSAT and MSE.

Situational awareness was hindered by uneven distribution of digital systems through the brigade combat team and command post in the brigade headquarters. There are currently no redundant or auxiliary channels for the transmission of the digital data communications. There was no deliberate communications plan for a digital communications loss. There was no communications redundancy with FM, S/C TACSAT, and EPLARS. The unit observed during this rotation was only adequately trained on FM.

RECOMMENDATION: There was only one signal company supporting the brigade; it probably should have been a battalion.

Observation No. 2: **An over-reliance on the new digital applique can have a destructive effect on a unit's situational awareness.**

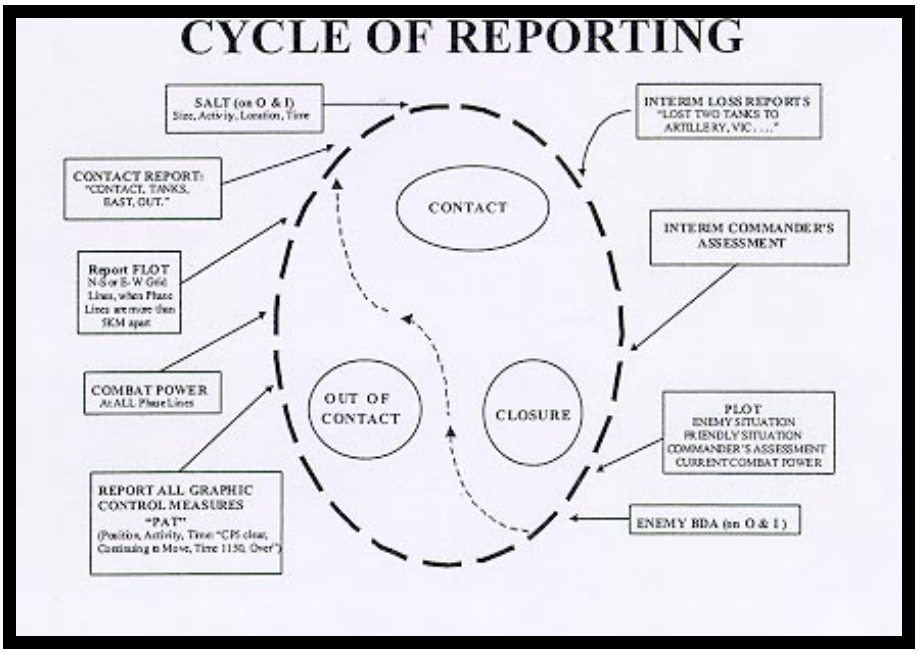
Discussion: Units that posses "digital enablers," seem to forget that they still need to "balance," and receive confirmation of current events as they unfold on a potential battlefield, with a clear unit cycle of reporting. As units cross the line of departure, and the shooting starts, the maneuver phase of the battle is underway. Reports are expected. These reports are critical to developing a *read* of the battlefield, and in keeping the commander informed.

RECOMMENDATIONS:

1. A system, or cycle of reports, must be in place for the command to see themselves in terms of available combat power, and to see the enemy as it is encountered on the battlefield. The cycle of reporting must inform the commander about the following:

? What is to my front?
? What is the enemy doing?
? What are we doing?
? What are we going to do?

2. A cycle of reporting needs to be an integral part of a unit tactical SOP (TACSOP).



3. Commanders cannot be everywhere, and they cannot see everything. Timely reports can facilitate teamwork and synchronization. Use whatever element is in the best position to see the battlefield to guide other elements to a position of advantage. The guiding element can drop down on the command net to give instructions to get the other element to the right spot.

4. Command assumption drills need to be rehearsed. Do *"what if?"* drills, where the order of command is different from that specified in the OPORD, since casualties usually do not occur in the same sequence. At all times, the officer in charge must know that he is in charge. Therefore, as leader casualties occur, the new chain of command must be announced, and the new commander must take charge immediately.

Counter-Reconnaissance.

Observation: **The counter-reconnaissance mission for a task force is still best served by a company team.**

Discussion: Positioning a company team, with the scouts attached, well forward of defensive positions, was observed to be effective. The scouts were positioned on high terrain and served as "lookers," and the tanks and BVFs developed engagement areas in the low ground and served as the "killers." On the two battles that were observed, the counter-reconnaissance company/team destroyed all regimental reconnaissance that entered the task force sector.

The company/team commander that executed the counter-reconnaissance mission was observed to spend the majority of his time preparing for the execution of that mission. He emplaced all tanks personally, looking at their fields of fire and ensuring that they were mutually supporting. He identified target reference points (TRPs) and engagement criteria. He coordinated with scouts and attached Canadian reconnaissance vehicles. When the regimental reconnaissance entered his sector, he destroyed all eight vehicles. However, there were numerous "double-tapping" of targets, resulting in an average of 4.5 rounds per kill. Additionally, there were no fire missions called by the company/team.

RECOMMENDATIONS:

1. Put much time and effort into the counter-reconnaissance mission to ensure success.
2. To assist the counter-reconnaissance effort tremendously, maintain close coordination with scouts.
3. Plan for and use indirect fires when they are available.✪

CHAPTER 3

How the E-BFV-Equipped Engineer Company Can Support Offensive Missions for the THREE-COMPANY BATTALION

by MAJ Michael Albertson, Center for Army Lessons Learned

The new three-company organization requires battalions to do more with less in the terms of actual systems in place and on the ground. Observing the new Limited Conversion Force XXI three-company Task Force in the offense raised concerns and issues:

- ➤ **Flexibility.** More be prepared and on-order missions.
- ➤ **Frequent Task Organization.**
  - ❖ More four-platoon and two-platoon company/teams (CO/TMs).
  - ❖ More re-task organization during operations.
- ➤ **CO/TMs will have more tasks to perform during missions.**
- ➤ **Task Forces must consolidate/reorganize after the attack because of the reduction in combat power and will rely on the brigade to exploit success.**
- ➤ **Two Axes of Advance.**
  - ❖ Critical decision is which axis the third company will maneuver.
  - ❖ Greater reliance on cross-over corridors.
- ➤ **Small or no reserve.**

As more is being asked of smaller units, the Bradley-equipped engineer platoon and company will be a valuable combat asset to the maneuvering units. This article discusses the role of the combat engineers and provides some tactics, techniques, and procedures for supporting maneuver units in offensive missions.

ISSUE 1: ***How does the FXXI engineer company support a three-maneuver company task force movement-to-contact (MTC) mission?***

DISCUSSION:

1. Using an armor task force as the model, the task force will typically task-organize into an armor team advanced guard with a mechanized team and an armor team making up the main body. The MTC can be conducted against either a stationary or moving enemy. The task force will conduct an MTC as part of a larger formation. The task force will be the advance guard or in the main body of a brigade formation.
2. Typical engineer tasks for an MTC mission continue to be:

- ● **Combined arms breaching.** The focus of combined arms breaching is on the task force in-stride breach, but the task force requires the capability to transition to a task force deliberate breach operation. Against a moving enemy, the task force will normally conduct breaching operations to overcome enemy situational obstacles. Against a stationary force, the task force will have to overcome tactical (directed), situational, reserve and protective obstacles.

● **Countermobility** (tactical employment to protect flanks and support the attack/transition to defense). The transition to hasty defense can occur as the result of initial contact or upon securing the objective.

● **Reconnaissance** (technical and tactical). Engineers may conduct reconnaissance prior to the movement or during execution to gather intelligence on obsticles and route clearances. As part of the overall reconnaissance effort prior to the movement to contact, engineers can conduct route or area reconnaissance and, if directed, route clearance and marking. During the execution of the MTC, the focus changes to the early identification of enemy situational obstacles and the best bypass or lane locations.

RECOMMENDATION: Figure 3-1 shows a technique to provide engineer support to a task force conducting an MTC.

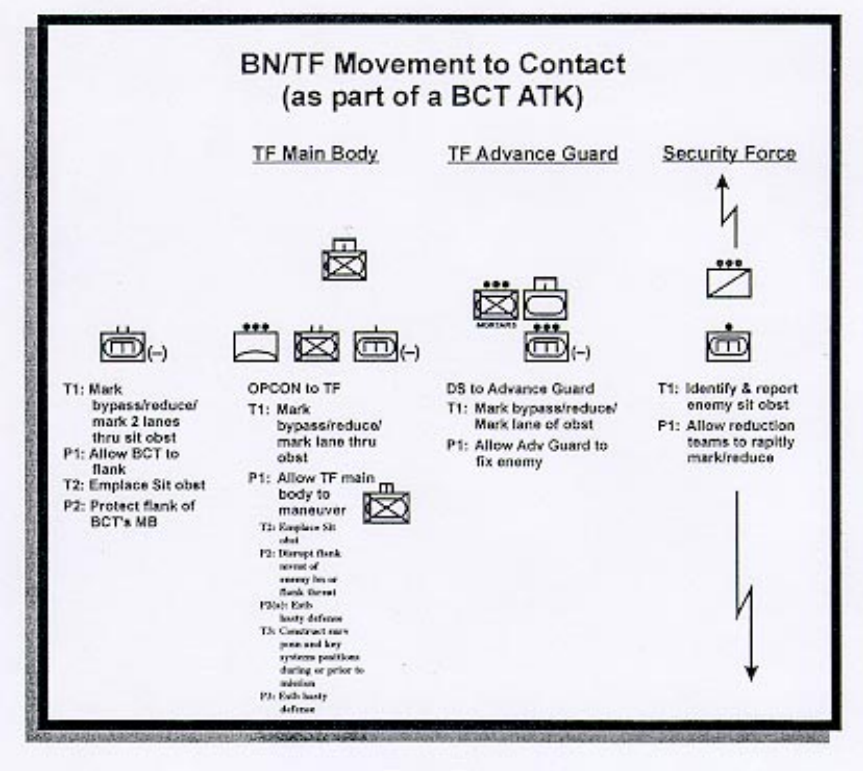


Figure 3-1

ISSUE 2: ***The supporting engineer force must execute several essential engineer tasks during the approach phase of an attack.***

DISCUSSION:

1. Key engineer tasks during the approach include:
   - **Mobility support to enable the support force to maneuver to the SBF.**
   - **Mobility support to both the lead company team and the task force main body.**
   - **Countermobility support to protect the flanks of the main body.**

2. The lead team of the task force, typically part of the support force, must be capable of overcoming both situational obstacles employed to disrupt the task force and tactical obstacles employed to disrupt in support of Combat Security Outposts (CSOPs). The enemy may also use situational obstacles to separate the task force main body from the lead company team. In either case, an engineer element moving in vicinity of the lead team can provide mobility support to both the lead team and the following main body. This support includes forming the breach force for a company team breaching operation to mark a bypass (primary) or create, proof, and mark a lane if required.

3. The engineer element will no longer be available to support the lead element while it is executing these tasks, but will possibly be available for additional tasks later in the operation. An engineer element moving with the task force main body can emplace situational obstacles to either flank if there are no adjacent friendly units. This requires an identified overwatching maneuver force. An engineer element moving to the rear of the lead task force can further upgrade the lanes and marking to support the maneuver of the brigade main body and allow the lead engineer element to continue to support the lead task force.

RECOMMENDATION: Figure 3-2 illustrates a way to provide engineer support during the approach.

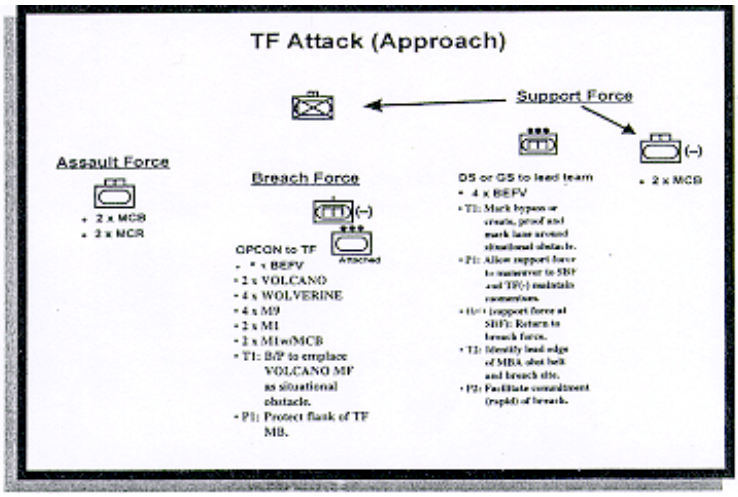


Figure 3-2

ISSUE 3: ***What is the impact of the Army XXI task force organization of three maneuver companies and a E-BFV-based force on the task force breach organization?***

DISCUSSION:

1. The Army XXI division operational and organizational concept calls for the division to attack to defeat an enemy division. Following this concept, a task force must be able to attack and defeat a battalion-sized enemy in the execution of offensive operations. It is likely that the task force will be required to conduct breaching operations to cross obstacles covered by the fires of a company-sized force. The organization for a deliberate attack against an enemy strongpoint includes three basic elements:

- ***Support force.*** The support force should be a company (+) or two company-sized force to set the conditions (suppression, obscuration, security).
- ***Breach force.*** The breach force must then be task-organized to create, proof and mark at least one lane, but preferably two, through the enemy's tactical obstacles and provide local suppression, obscuration, and security. This calls for one or two engineer platoons with the appropriate mobility assets and a security element based on expected enemy counterattacks and the size of the enemy force being masked from the support force by the breach force.
- ***Assault force.*** The assault force must have the combat power to destroy the remaining elements of the company force at the point of penetration.

The combined actions of these three units, or the effect of their synergy, will allow the attacker to break into the enemy defense and control actions as the objective is secured.

2. Based on the number of company level headquarters in the task force, it is likely that the engineer company commander will assume the role of breach force commander.

RECOMMENDATIONS:

1. The illustration below (Figure 3-3) provides an example of how a Task Force could task-organize itself to conduct a deliberate attack of a complex obstacle:

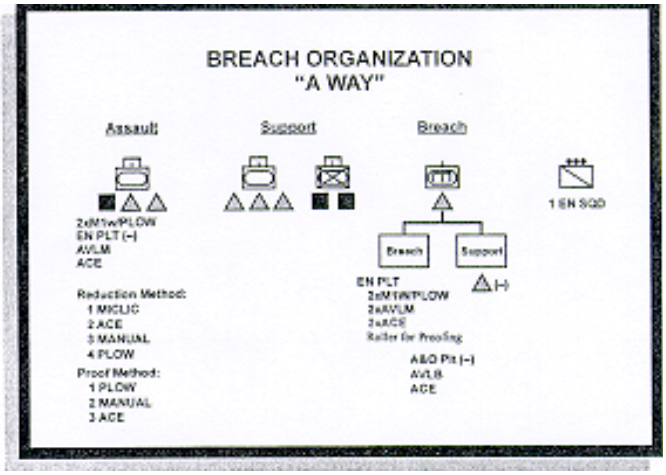


Figure 3-3

2. The scheme of maneuver for this battalion, for illustrative purposes, might look something like Figure 3-4, below. The illustration depicts the enemy range fans and the engagement area. For the breach to succeed, conditions for its success must first be set. The support force must be established before the breach force can move forward. Units must *fight* to secure a support-by-fire position:

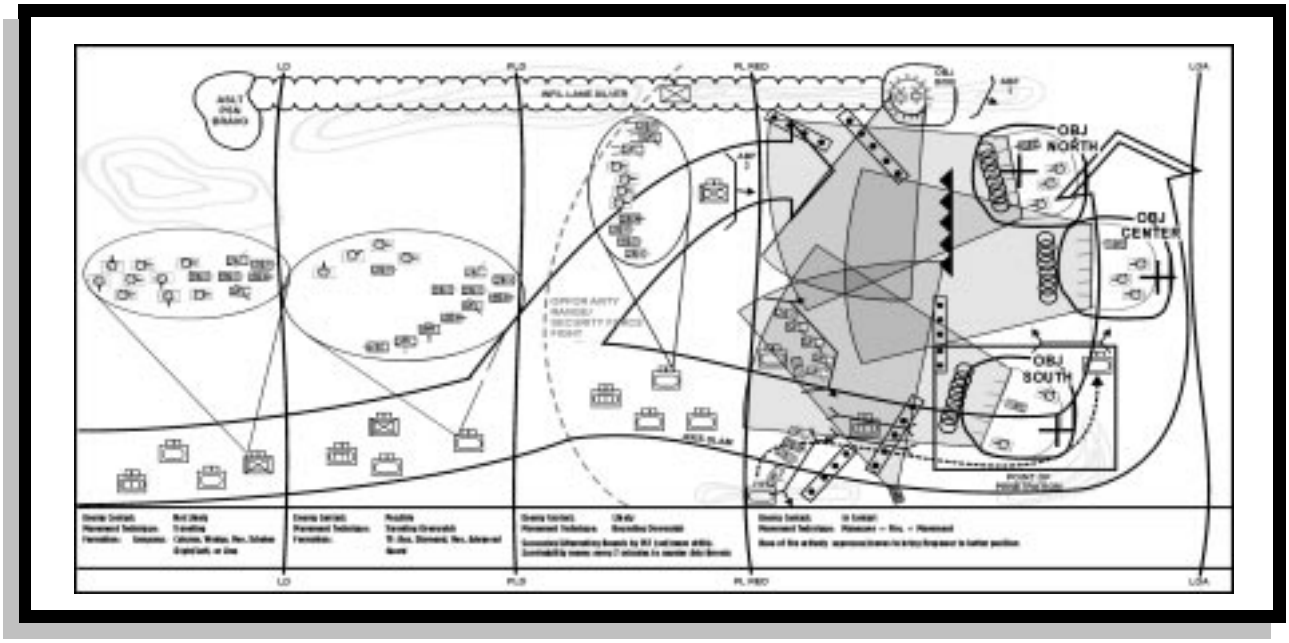


Figure 3-4

3. As many O/Cs will tell you, the critical piece to any breaching operation is the breach itself. Once the Support-by Fire (SBF) position is set, then the breach force can be committed to execute a breach into the enemy defenses, as illustrated in Figure 3-5, on page 3-6. ***NOTE:*** **Although smoke is not illustrated in Figure 3-5, obscuration becomes even more important to a breach operation since we have reduced the force ratio.**

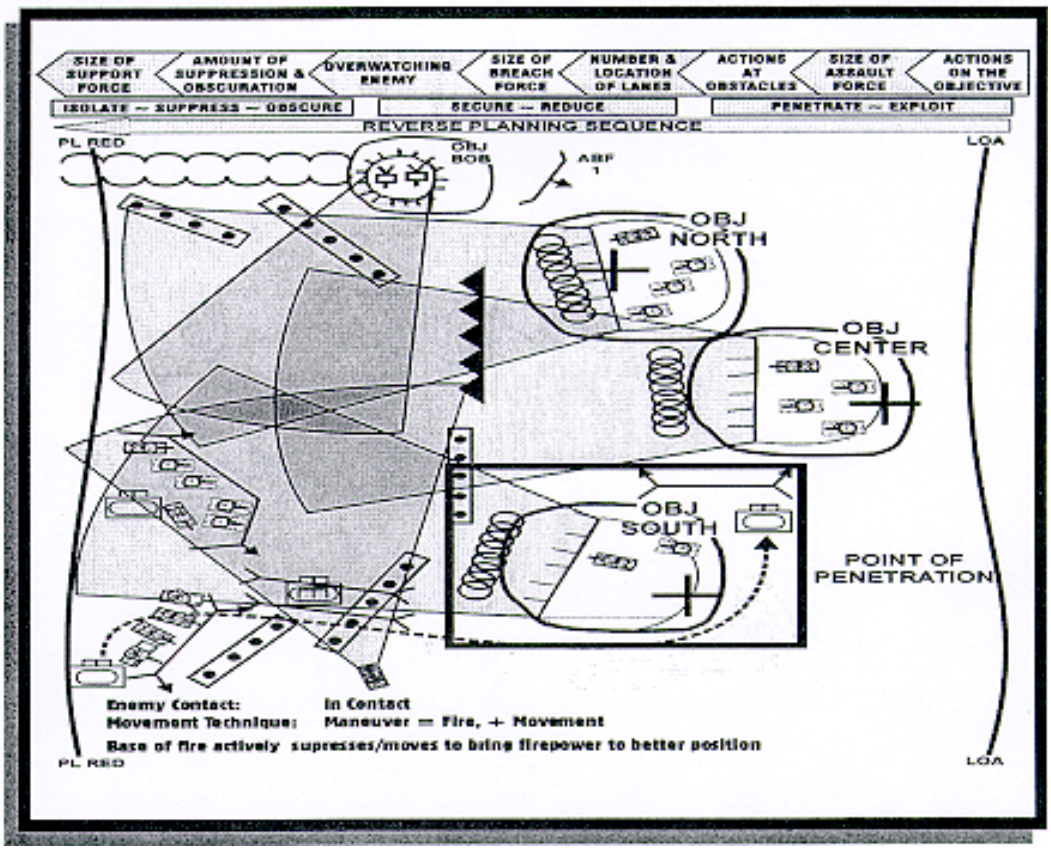


Figure 3-5

4. Figure 3-6 on page 3-7 illustrates a recommended task organization for a task force breaching operation and the reduction of a complex obstacle. In this example, the engineer company, with an attached tank platoon, has been further organized into an internal support, breach, and assault force. These forces are organized to accomplish a specific task and purpose.

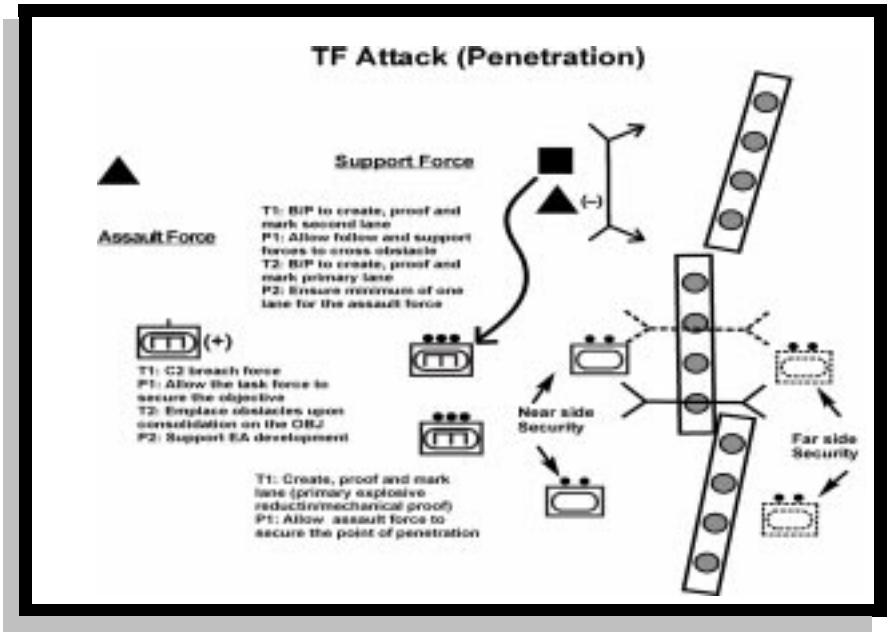


Figure 3-6

5. The *Breach Force* of this task force would again organize itself to accomplish a specified task. In this case, the task is to establish two breach lanes through a complex obstacle, with the purpose of facilitating the forward passage of the entire task force. Figure 3-7, below, illustrates how a breach force may be organized:

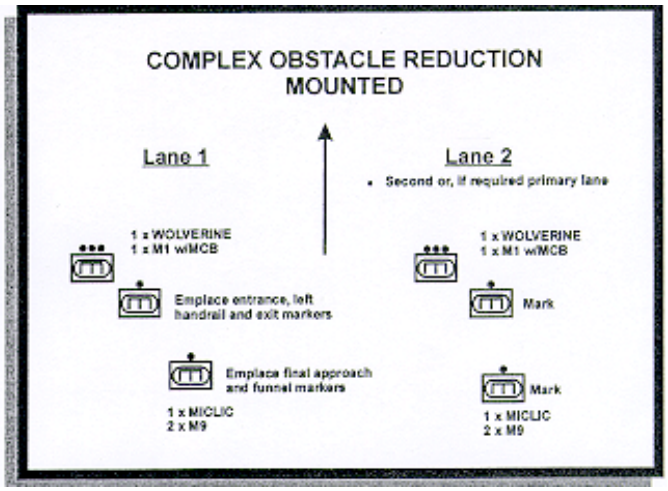


Figure 3-7

ISSUE 4: How does the engineer platoon organization impact *lane-marking* drills?

DISCUSSION: Once the reduction element of the breach force creates and proofs a lane, two engineer squads of the Army XXI engineer platoon will conduct rapid lane marking (initial lane-marking pattern). If the engineer squad pauses to mark the final approach marker and the entrance funn1:42 PM1:42 PMel markers prior to emplacing the entrance markers and left handrail markers, they could possibly delay the commitment of the assault force.

RECOMMENDATIONS:

1. For rapid lane marking, designate one squad as the primary marking squad with the task to emplace the entrance, left handrail, and exit markers. Designate the second squad to emplace the final approach marker and entrance funnel.
2. The primary squad begins marking immediately behind the proofing asset while the second squad moves forward from the assault position to mark the entrance funnel.
3. The second squad emplaces the final approach marker and possibly the far recognition marker (intermediate lane-marking pattern) while in route to the lane entrance.
4. The platoon leader supervises the reduction, proofing, and primary marking squad while the platoon sergeant supervises the second marking squad.
5. The assault force can position a leader near the breach force commander, who owns traffic control, to assist with commitment of the assault force. The assault force should arrive at the lane just as the breach force completes its tasks.

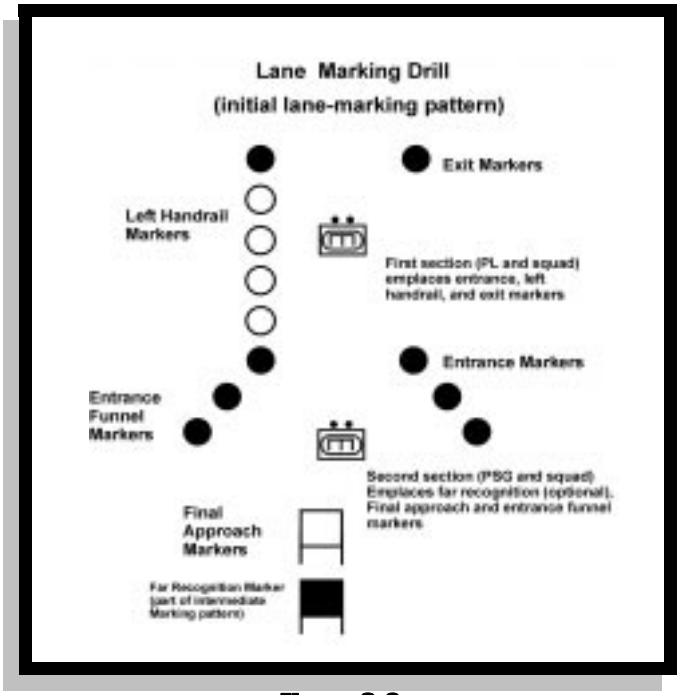


Figure 3-8

ISSUE 5: How does the engineer platoon organization impact *bypass marking* drills?

DISCUSSION: Similar to the discussion above, commitment of the assault force could be delayed if they must wait for one engineer squad to place all bypass markings.

RECOMMENDATION: Again, the most rapid technique of marking a bypass requires a minimum of two squads. Once the unit acquires the obstacle and identifies the limits (at least partially), the primary marking section (platoon leader and squad) marks the handrail along the depth of the obstacle. The second section (platoon sergeant and squad) marks the front edge of the obstacle at least partially. The amount of frontage marked is METT-TC-dependent, but, in general, this marking section should remain within supporting distance of the main body. Figure 3-9 illustrates a platoon bypassmarking technique.

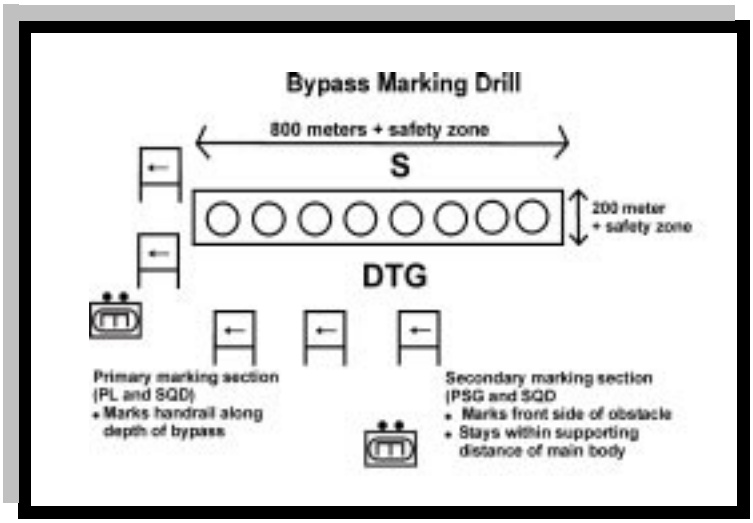


Figure 3-9

ISSUE 6: ***Engineer leaders, equipped with the new BEFV, need to be proficient in direct fire planning and control.***

DISCUSSION:

1. As already mentioned, the engineer company commander will likely be the breach force commander as part of a task force breach organization under the new three-company maneuver task force. The breach force commander must control fires for both the security element of the breach force and during actions on contact. Similarly, engineer platoon leaders and perhaps battalion commanders will likely be the breach force commander for company team and brigade-level breach organizations respectively.

2. The requirement to plan and control fires applies to the current M113-based engineer force, but is even more essential for an M2-based force. Engineer leaders must, therefore, integrate direct fire planning and control into every operation – both offense and defense. Without proper planning and control of direct fires, the breach force will not adequately provide local suppression and security at reduction sites, will not survive contact with the enemy, and could create a fratricide risk to other friendly forces.

RECOMMENDATION: The following two figures illustrate a technique that engineer leaders at all levels can use to successfully integrate fires and assist in the control of these fires into combat operations. Figure 3-10 shows a COA sketch for an engineer-led breach force in support of a task force breaching operation during an attack. The breach force commander should develop a sketch to convey his plan. ***NOTE:*** **Although smoke is not illustrated in Figure 3-10, it must be considered because it will affect where and how far friendly forces can shoot.**

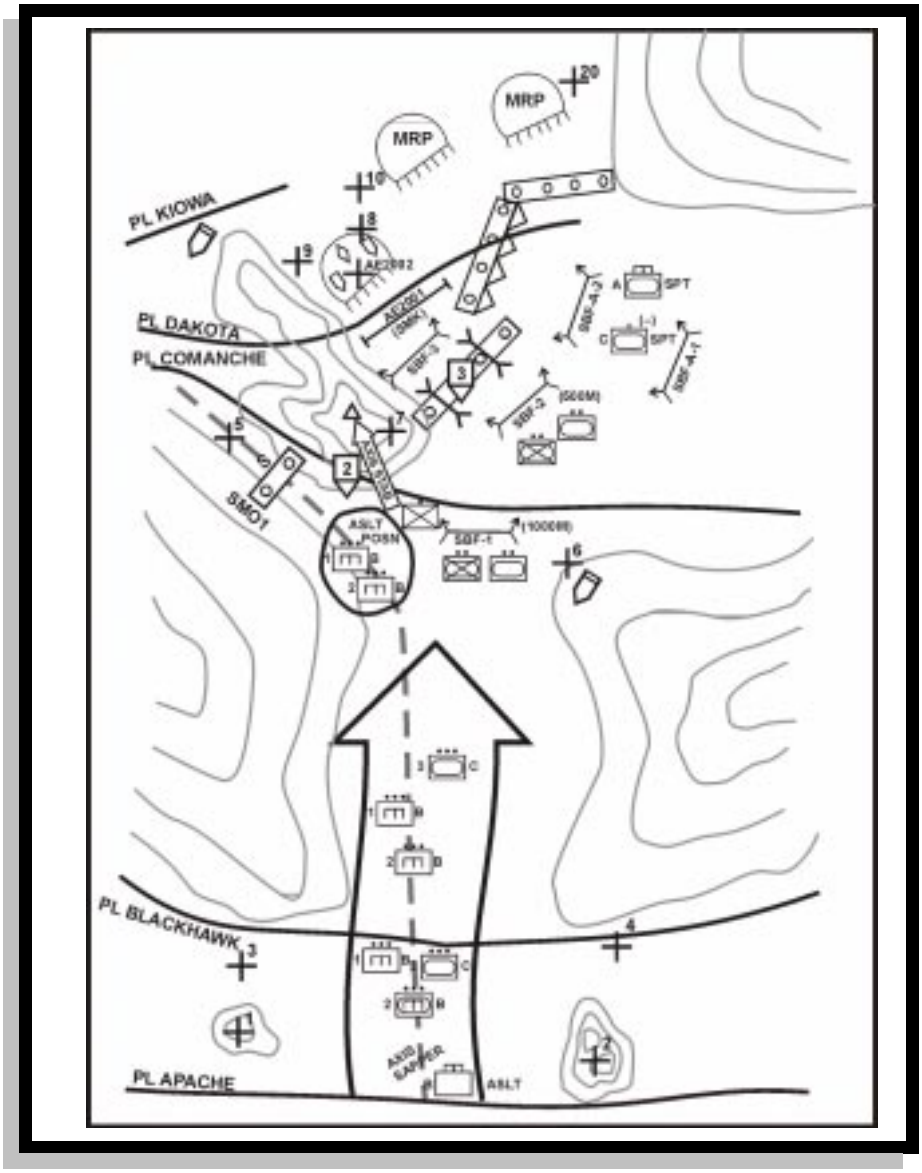


Figure 3-10

The execution matrix (Figure 3-11 below) provides an example of a way, utilizing an execution matrix, to integrate direct fires, movement techniques with formations, and breach force tasks.

Unit	LD PL Apache	Engineer Assault Position PL Blackhawk	Secure Breach Site (NS) PL Commanche	Breach PL Commanche	Secure Breach (FS) PL Commanche
Eng Company	Company Vee Formation 1st-Left; 3rd-Right White Trails Traveling overwatch Rad Direct @ PL Apache	Bound by Platoons; Axis Supper 1st-Left; 3rd-Right White Trails 2nd: Occupy SBF-1 1st: Bound to CP-2 2nd: Trail 1st	Bound by Platoons; Axis Supper 3rd: Occupy SBF-1 Orient TRP-8 to TRP-9 1-TK, 2-IDMP 1st: Orient TRP-5, Secure En Ass Posn 2nd: O/O, Bound to CP-3	3rd: Secure Breach Site O/O Shift fires to TRP-8, 1-IDMP 1st: Prep for Breach, Moves to SBF-1 2nd: Reduce Lane-5	3rd: Assault thru Lane5-5 Occupy SBF-3 Orient TRP-9 1st: O/O Reduce Lanes-N 2nd: Pass/Guide Assault Co-T/M
Attached Armor Plt (1) M1/PLOW (2) M1A2 (2) M2 (1) DISMT SQD	Echelon Right Orient TRP-2 & TRP-4	Orient TRP-6 & TRP-7 TRP-6: BRDM, 4-rds HE Bound to SBF-1 TRP-7, Enemy Dismounts 4-rds, HE, 25-mm (AP) Hi-rate At My Command (AMC)	Infantry dismounts and attacks along Axis Stab to clear enemy dismount OP Bound to SBF-2 Orient TRP-9, 1-TK, 2-IDMP 8-rds Sabot, 25mm AP (Hi-rate) At your Command (ATC)	Secure Breach Site vic SBF-2 O/O shifts fires to TRP-8 1-BMP, 4-rds SABOT, 25mm AP ATC INF Dismounts Orient TRP-9 R/P to set smoke pots	Pass thru Lane-5 Occupy SBF-3 Orient TRP-9 1-BRDM, 25mm (HE) ATC Provide FS Security to Breach
1ST PLT (4) BEFV (1) M1/PLOW (1) ACE (1) AVLB	Echelon Left Orient TRP-1 & TRP-3	Bound to CP-2 Secure Engineer Assault Position Orient TRP-5 Employs/Overwatch 2-MGPMS (SMG1)	Orient TRP-5 O/O, Execute MGPMS TRP-5, Enemy Dismounts, BRDM (1) Supper Squad, SAM/AT4 (ATC)	Occupy SBF-1 R/P to continue Lane-5 reduction Employs for-recognition patrol (1) Sqd orients TRP-5	O/O Reduce Lane-N Mark Lane Open Signal Guide Assaulting CO-Tm thru Lane
2ND PLT (4) BEFV (1) M1/PLOW (1) ACE (1) AVLB	Follow 1/B/4 EN Plt Wedge Orient TRP-3 and TRP-4	Follow 1/B/4 EN, Plt Wedge Link up with Engr-SCT TM-2 @ CP-2 Occupy Engr Assault Positin Prep for Breach	O/O, Move to POB @ CP-3 Prep to reduce Lane-5	Reduce, Proof, Mark Lane-5 vic CP-3	Pass 3rd thru Lane-5 Mark Lane Open Signal Guide Assaulting CO-Tm thru Lane
A & O (2) VOLCANO (2) AVLB (5) ACE (2) CCV RELOAD (MICLIC) (1) M113 (AME) (1) FUELER	Trail 2/B/4 EN Occupy CP-1	Hold @ CP-1	Move M113 AME & MICLIC Reloads to CO-2 Hold Trains(-) @ CP-1	Prep for Casevac Prep MICLIC Reloads Hold Trains(-) @ CP-1	Conduct Casevac Conduct MICLIC Reloads O/O Move trains to CP-2

Figure 3-11

ISSUE 7: ***Engineer platoons at the CTCs continue to react poorly to most forms of contact.***

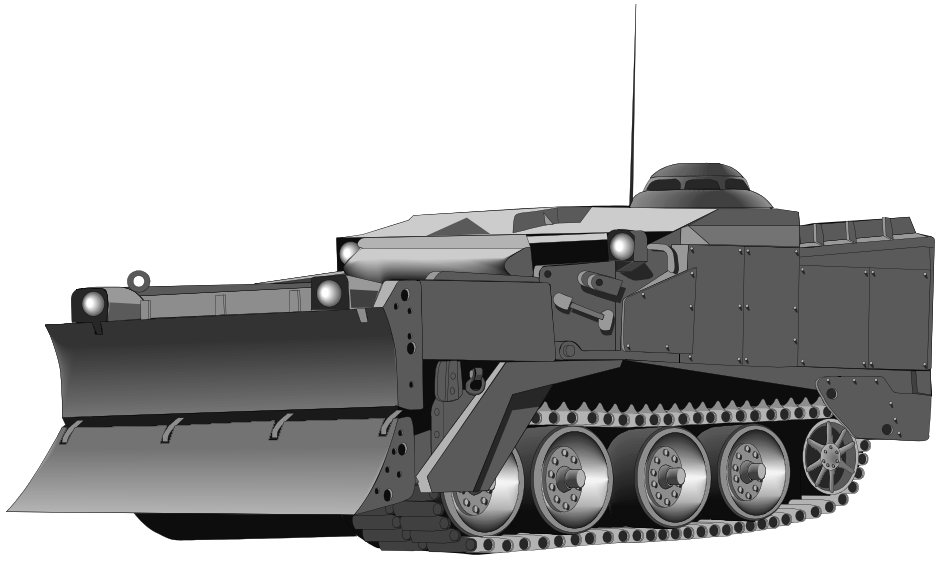
DISCUSSION:

1. An M2-based engineer force has a greater capability to react to contact and, therefore, survive to accomplish their engineer mission. On the other hand, the M2, as a greater threat to the enemy, is in most situations a higher value target than the M113.

2. Engineer platoons must be able to survive all forms of contact to accomplish their essential engineer tasks. They must fully understand and be able to react to the seven forms of contact listed below:

- **➤ Visual contact.**
- **➤ Direct fire contact.**
- **➤ Indirect artillery fire contact.**
- **➤ Obstacles.**
- **➤ Aerial/enemy air contact.**
- **➤ NBC contact.**
- **➤ IEW, or jamming.**

RECOMMENDATION: M2-mounted engineer forces need to train actions on contact drills to both take advantage of the M2's capabilities and to mitigate their increased tactical risks. Actions on contact drills have been developed and need to be trained at the platoon level.✪



CHAPTER 4

How the E-BFV-Equipped Engineer Company Can Support Defensive Missions for the THREE-COMPANY BATTALION

by MAJ Michael Albertson, Center for Army Lessons Learned

During NTC Rotation No. 98-10, observer/controllers (O/Cs) spent some time discussing and identifying suitable roles and missions for units and attachments that will support the Army XXI three-company battalion. During previous rotations, when rotating battalions executed a defensive mission, it was not uncommon for a company team, with the scout platoon attached, to occupy positions well forward of the main battle area and establish a counter-reconnaissance screen. This permitted the remaining three company teams to prepare the defensive framework for the task force in a secure environment. With attached engineer support, the three companies could ensure that their battle positions were mutually supporting and achieve interlocking sectors of direct fire weapon systems into a task force engagement area (EA).

With the smaller three-company organization, the concept of interlocking sectors of fire is difficult to achieve with adequate mass. If one company team is positioned forward to conduct the counter-reconnaissance mission, that only leaves two company teams to develop the defensive framework for the task force. It is difficult to achieve "mutual support" between battle positions with two company teams. More two-company engagement areas may emanate as a result of the new three-company organization.

Also as a result of the new task organization, some O/Cs at the NTC believe they will see more "mobile defenses" in the future. This will translate into the execution of more delays, and possibly ambushes at the company team level, to disrupt, shape, and attrit any approaching enemy. It will be critical to disrupt the enemy to slow his forward momentum early in his approach, before the direct fire engagement.

There will be fewer weapon systems available, and, for this reason, it becomes extremely important to rehearse tactics and techniques for massing the effects of all available direct fire weapons. The reduced combat power will also require the task force to rely on the factors of careful time and space management, to decisively engage an approaching enemy. The technological enablers, in the form of greater situational awareness gained through a reconnaissance in depth of the attacking enemy, will be critical for success.

The role of the tactical reserve is likely to change. It is very unlikely that an Army XXI task force can maintain a company team-sized reserve. If a task force maintains a reserve, it will very likely be a platoon-sized force. Because massing available combat power at precisely the right time and place will be critical for defensive victory, units under the Army XXI framework will be required to exercise greater flexibility than did the units in the Army of Excellence model. Because a reserve force may not be possible, units will most likely execute more "be prepared" and more "on order" movement instructions. In this fluid environment, flexibility and agility are achieved and measured by the speed at which units can receive and execute fragmentary orders. O/Cs have noted that units of Army XXI can expect to change and modify their task organization almost constantly during heated combat engagements.

Within this framework, the Army XXI combat organization will be quick to capitalize on the Engineer-Bradley Fighting Vehicle (E-BFV). The support provided by combat engineers has always been critical to success on the battlefield. With the loss of the fourth maneuver company in the heavy battalion, effective utilization of engineers, and the combat multipliers they bring, the new direct fire capability of the combat units must be closely examined. In an effort to capitalize on the addition of the E-BFV, the following defensive issues were addressed:

ISSUE 1: ***With only three maneuver company teams in a task force (45 platforms), should the supporting M2-based engineer company occupy a battle position (BP) during defensive operations?***

DISCUSSION: An M2-based engineer company could potentially enhance the task force's direct fire combat power with nine M2s. Executing maneuver tasks, however, would result in a corresponding decrease in engineer tasks. The engineer force would require the necessary time to develop its engagement area (EA) and prepare to accomplish its maneuver task. This is time taken away from the obstacle effort. Additionally, engineer assets would not be available to provide mobility support to repositioning forces or to a counterattack force (strike force in a mobile defense). Even as the force relies more on the use of scatterable mine systems, engineer squads will still be decisively engaged in siting and marking these minefields and emplacing supplemental conventional minefields, construction, and demolition obstacles. When the event trigger for disengagement occurs in the forward area, engineer units need to continue to prepare the defense in depth or transition to the offense.

RECOMMENDATION:

1. The maneuver force commander with command over an engineer force must not assign the mission to occupy and defend a BP unless he is willing to accept the corresponding loss of engineer support. The decision to use engineers in this role must be made only after careful analysis of the commander's estimate.

2. Given that the engineer unit is in a command relationship, a technique is to have two-company teams each prepare an engineer platoon position as part of the company BP. This is done routinely when a company/team gives up a platoon to augment the security effort and is expected to receive the platoon back for the main defensive battle.

➤ **The company team sights and stakes in the engineer platoon's M2s as well as the dismounted weapons.**

➤ **The company team marks all four corners of the vehicle fighting position with pickets and marks the friendly side of the picket on the driver's side with a chemical light for periods of low visibility.**

➤ **The unit completes a range card to the standard described in Annex E of FM 23-1.**

➤ **The engineer platoon needs to attend the company OPORD briefing and participate in the rehearsals.**

3. Employ engineer support to the task force in direct-support (DS) role only. This prevents the task force commander from committing engineers to a BP if the engineer battalion needs them to weigh the effort/work in depth of sector.

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ISSUE 2: ***How will an engineer company support a task force defensive operation?***

DISCUSSION:

1. With increases in situational awareness, battlespace and the ability to execute precise operations, mobile defenses become the norm. During a mobile defense, engineers must support both the **fixing force** and the **striking force.**

a. Engineer tasks to support the fixing force include:

➤ **Emplacing obstacles (directed, situational and reserve) as part of engagement area (EA) development.**

➤ **Constructing fighting positions for direct fire weapon systems.**

➤ **Constructing survivability positions for critical assets such as C^4I nodes, radars, and sensors.**

b. Engineer tasks to support the striking force include:

➤ **Mobility support.** The engineers form the breach force to mark bypasses (primary) or create a lane (secondary) in support of a company team's scheme of maneuver.

➤ **Countermobility support.** The engineers emplace situational obstacles as part of a hasty EA development to integrate fires from a series of on-order ABFs or BPs.

2. Because of limited countermobility and survivability capabilities (few dismounts/two VOLCANOs and four M9s), the force requires echelon-above-division engineer support for a deliberate defense. The task force must allocate sufficient time to allow the engineer unit to prepare and rehearse with the striking force. The staff must develop an event trigger or decision point to disengage from support to the fixing force.

RECOMMENDATION: Figure 4-1 illustrates a way to provide engineer support to a task force mobile defense.

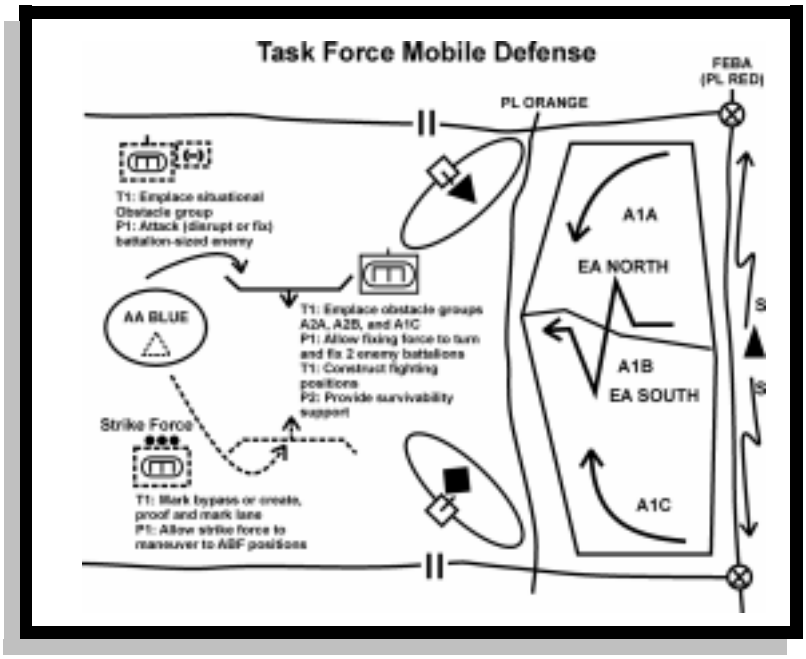

Figure 4-1

ISSUE 3: ***What is the impact of the FXXI engineer platoon design on conventional obstacle efforts?***

DISCUSSION:

1. Given equal training, the FXXI engineer platoon productivity is reduced by more than one third from that of the larger AOE engineer platoon. There are two methods to improve the productivity of this platoon, or any platoon for that matter.

➤ **The first method is to augment the effort with non-engineer soldiers.** This comes with an obvious cost, and the unit must develop drills to efficiently integrate this support.

➤ **The second method is to improve productivity by providing additional tools to the platoon.** These include a mechanical marking system and the increased availability of scatterable mines such as mine canisters for the Volcano system.

2. While the increased reliance on scatterable systems makes sense given the resource intensiveness of conventional obstacle emplacement, the force should retain a conventional capability for several reasons:

➤ **Conventional effort may be the best solution in some situations (restrictive terrain).**

➤ **The use of a wide variety of obstacles will complicate the enemy's breaching operations and require the enemy to have multiple reduction techniques to successfully reduce our obstacles.**

➤ **The ROE may limit the use of obstacles to non-lethal options such as wire and other constructed obstacles.**

➤ **It is much easier to *reduce* the size of the force if the need arises.**

RECOMMENDATIONS:

1. Develop a mechanical marking device and increase the availability of Class V scatterable mines.
2. Retain the capability within the engineer force to emplace conventional minefields and constructed obstacles.
3. Develop improved conventional mines (full-width mines that do not have to be buried or are faster/easier to uncrate and prepare).
4. Develop a mechanical system for executing conventional mines.

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ISSUE 4: ***How will the reduced number and size of engineer squads impact the row mining drill?***

DISCUSSION:

1. The reduced number and size of engineer squads will require an adjustment to the row mining drill. The FXXI engineer platoon cannot task-organize into simultaneous siting and recording, marking, laying, and mine dump parties, which would require a total of 12-17 soldiers. The platoon must be augmented with non-engineer assets.
2. The alternative is to execute the tasks sequentially, at least partially, which has a negative impact of increasing the time duration.

RECOMMENDATIONS: The best solution is to develop two drills: one for an organic platoon and one for an engineer platoon with augmentation.

1. **Drill 1 (Organic Engineer Platoon):** The platoon leader task-organizes the platoon into the following parties:

- **Siting and recording**
- **Marking**
- **Mine dump**
- **Laying**

a. The platoon leader and one squad participate in the mini-rehearsal to site in the obstacle group during the EA development drill. The overwatching maneuver unit provides the "enemy" vehicles required to replicate the enemy force.

➤ **Once the siting party marks the obstacle group trace, the squad begins emplacement of the perimeter fence while the platoon leader and two-three soldiers lay out each minefield.** This crew also marks the centerline (scatterable) or required markings for all other obstacles in the group.

➤ **Four-sided fences are the standard, beginning with the enemy side, then the sides, and finally the friendly side.** One squad uses an M2 or other cargo vehicle to drop wire and pickets off along the fence line. The dismounts then pound the pickets and string the wire.

➤ **After all the wire and pickets are laid on the ground, the M2 can go back to the mine dump or Class IV/V point to get more materials while the dismounts install the perimeter fence.**

➤ **An opening must be left at both sides of the minefield at the friendly end to allow one way traffic flow of all vehicles inside the minefield.** This method resembles the same techniques used with HEMMT support.

b. The platoon sergeant and the other squad perform the functions of the mine dump party at the mine dump (service station) as the mines are transferred from a transport asset to the emplacing vehicle (tail gate). If necessary, the mine dump is done at the Class IV/V point (supply point).

➤ **These functions include loosening and greasing fuse and booster wells and ensuring proper functioning of the mine.**

➤ **The team transloads a mine strip onto each laying party's emplacing vehicle or a mine-delivery system.**

➤ **In a M2, an entire turn/block row of M21 mines can be placed on the floor if laid on the side and not fused.** M15 and Ml9 mines could probably also be laid on their side, although this has not been tested.

➤ **If necessary, a single M2 will hold enough mines inside for a complete fix/disrupt minefield, if mines are stacked sideways and two deep.** On the sides of the Bradley, with the side handle modification, the Bradley can carry around 30 pickets outside, in addition to the 15 rolls of wire on deployed trim van. If the side handles are not modified, the section leader Bradley can carry the pickets inside the troop compartment.

c. Once the mines are prepared and uploaded, the platoon sergeant and squad proceed to the minefield site. This squad now functions as the laying party under the supervision of the platoon sergeant.

➤ **At the start row marker, the carrier team moves into position and prepares to lay mines.** The sapper team ties a rope to the end of the lowered ramp or the tow pintle, and ties a partially filled sandbag to the other end of the rope. The rope length from the end of the ramp door to the sandbag is the correct spacing between mines.

➤ **The mine-laying squad has Soldier 1 sitting at the rear door seat, taking mines one by one from the floor and handing them to Soldier 2 walking behind the Bradley.** When the last mine on the ground reaches the end of the 6-meter rope, the next mine goes down in the proper place.

➤ **The Bradley Commander (BC) (Squad leader) ensures that the driver is maintaining a correct azimuth (usually only required for novice drivers or hours of darkness when the intermediate markers and end row markers cannot be seen).**

➤ **For buried mine rows, the dismounts make a second pass digging in the mines after the row has been laid.**

➤ **Soldier 3 travels behind the mine-laying vehicle, fusing the mines and preparing the mine for arming (i.e., exact placement, placing tilt rod next to the mine).**

➤ **The team leader on the ground is supervising the actions of the dismounts.** He removes the temporary markers installed by the siting and recording party and replaces the end row markers with permanent markers, completes the strip feeder report (refer to Figure 6-6 of FM 20-32), and arms and buries the mines.

d. While at the minefield site, section leader vehicles will take up overwatch positions on the minefield site, where the leaders dismount to check on the status or inspect the emplacement. Their M2s can also be used to carry mines and pickets in the rear of the vehicle. Because of the plow on the front, section leader M2s do not have trim-vanes; therefore, they can carry only the amount of wire they can strap on the side. The driver and gunner of those two vehicles should not dismount unless there is an emergency.

e. Once the rows have been laid and the minefield NCOIC is satisfied that the requirements in FM 20-32 have been met, the fence is closed and DA Form 1355 is completed and sent to higher level.

2. **Drill 2 (with Non-Engineer Augmentation):** The engineer platoon with supporting soldiers task-organizes as described in the table below.

Task Organization of an Augmented Engineer Platoon

Task Organization	Officer	NCO	EM	Equipment
	(Engineer/non-engineer)			SITEMP, maneuver and fire support graphics, obstacle overlay, execution matrix, GPS, lensatic compass, minefield record forms, stakes, cones, or pickets, picket pounder, engineer tape on reels, and nails to peg tape (Note 1).
Siting and Recording Party	1/0		2-3/0	
Marking Party		1/0	0/6-8	Barbed wire or concertina, marking signs, lane signs, wire cutters, gloves, picket pounder and pickets (Note 2).
Mine Dump Party		1/0	2/4-6	Wire cutters, grease, rags, gloves, NVDs, and pliers (Note 3).
Laying Party (Note 4)		1/0		Strip feeder reports.
Carrier Team			2/0	Vehicle.
Sapper Team		1	1-3/1	Wrenches, fuses, row markers.
Digging Team			0/1-2	Picks, shovels, and sand bags
Total (Note 4)	1/0	4/0	7-10/ 12-17	

NOTES:

1. The use of the mini-rehearsal to site an obstacle group during EA development may initially require all of the engineer platoon vehicles to portray the enemy's maneuver through the EA. An alternate solution is to use the engineer platoon leader, maneuver company team 1SG, and other maneuver team headquarter's vehicles.

2. Minefield marking is time and labor intensive. Any available soldiers should be placed on this team, especially when marking scatterable minefields.

3. If the unit uses the supply point or tailgate resupply technique, the unit must task-organize to do the mine dump tasks at the Class IV/V point or at the point where the mines are transferred to the emplacing vehicle. See Table 2-2 and Table 2-7, FM 20-32, for additional mine dump and Class IV/V supply point planning factors.

4. The unit may employ one or more laying parties. Each laying party emplaces one row of mines at a time.

5. Organization may vary depending on terrain, soldiers, and material available and proximity of the enemy. This typically requires augmentation by non-engineer soldiers. Non-engineer soldiers can be integrated into any of the parties, but it is simplest to integrate them into the marking and mine dump parties in squad-size units, or as individuals into the digging team.

a. The siting and recording party moves with the "enemy force" during the mini-rehearsal to mark the trace of the group or individual obstacles. The siting and recording party then selects the landmarks, and marks the start, intermediate control, and end row markers for each row, or the center line for scatterable minefields. If available, the marking party begins to emplace the fence.

b. At the same time (or if possible, in advance) the mine dump party task-organizes the minefield packages into mine-strip packages (complete with the right number, type, and mix of fuses and boosters). They prepare the mines for emplacement, but they do not fuse the mines at the mine dump. Preparation includes loosening and greasing fuse and booster wells and ensuring proper functioning of the mine. The team transloads a mine strip onto each laying party's emplacing vehicle or a mine-delivery system.

c. The laying party proceeds to their assigned row.

➤ **At the start row marker, the carrier team moves into position and prepares to lay mines.**

➤ **The sapper team ties a rope to the end of the lowered ramp or the tow pintle, and ties a partially filled sandbag to the other end of the rope.** The rope length from the end of the ramp door to the sandbag is the correct spacing between mines.

- **Soldier 1 is at the rear of the squad vehicle.**
- **Soldier 2 sits on the edge of the ramp or open door.**
- **Soldier 3 walks behind the carrier.**

➤ **Soldier 1 fuses a mine and passes it to Soldier 2.**

➤ **Soldier 2 records all the mines issued.**

➤ **Soldier 3 places the fused mines on the ground when the sandbag tied to the rope is even with the previously laid mine.**

➤ **The laying party NCO walks behind the vehicle and supervises mine laying.** He removes the temporary markers installed by the siting and recording party and replaces the end row markers with permanent markers. He also completes the strip feeder report (again, refer to Figure 6-6 of FM 20-32).

➤ **Soldier 4 walks behind the vehicle, and arms and buries the mines.**

➤ **The procedure is repeated for each row.** If more than one laying party is employed, the second laying party begins once the first party has moved a safe distance (approximately 25 meters) along its row.

d. The marking party completes the rear boundary fence, and the recording party completes DA Form 1355.

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ISSUE 5: ***FXXI units rely heavily on executing their countermobility tasks with scatterable mine systems. When should the engineer battalion consolidate the battalion's ground Volcano assets?***

DISCUSSION: With the reduced number of blade assets and engineer soldiers, the engineer battalion's six ground Volcano systems are the focus for execution of counter-mobility tasks. With only one load, the battalion can emplace nearly 7 kms of minefields (6,600 x 120 meters) in 20 minutes. Leaders may desire to centrally control these assets by creating an ad-hoc Volcano platoon at the battalion level. However, during many missions, the dispersion and number of targets require decentralized execution which negates the advantages of using a battalion-level organization. Planning, preparing, and executing Volcano missions in support of task force maneuver is actually hindered by the centralized control. Control at the engineer battalion level requires that the battalion issue a complete OPORD to the Volcano subunit. It also becomes necessary for the engineer battalion to logistically support this separate unit to include LOGPAC and CASEVAC support. However, the engineer battalion commander is not normally responsible for the AO in which the targets are located nor does he have control of the overwatching maneuver force and the observer assets to monitor NAIs and TAIs. This leads to difficulties in integrating fires with obstacles, and ensuring the area is clear before execution. For most brigade missions, it is not possible for a single platoon-sized element (Volcano team) to emplace Volcanos throughout the width and depth of the brigade AO.

RECOMMENDATION: Task-organize Volcano assets using the following considerations:

1. Determine maintenance status, loads available, and location of all systems during EBA.
2. Integrate employment of Volcanos into each maneuver course of action (scheme of scatterable obstacles).
3. If employed to support task force maneuver, task-organize to task force.
4. If employed to support brigade maneuver but executed within only one task force's AO, task-organize to that task force. Brigade order must direct the execution of the obstacles as well as direct the task force to disrupt, fix, turn or block an enemy force at a designated location through the use of assigned BPs, SBF/ABFs, and EAs. In other words, the brigade must be no more or less directive with obstacle than it is with maneuver tasks.
5. When the desired effect requires multiple Volcano minefields, within a single EA (may support more than one possible EA) overwatched by a brigade-level maneuver force (for example, the brigade reserve), consider task-organizing the Volcano systems with engineer leadership to the brigade-level maneuver force.
6. Synchronize the Volcano plan during COA analysis (war gaming). For Volcanos employed as situational obstacles, the timing for Volcano movement and emplacement, and maneuver force fires integration with a corresponding observer plan must be determined during this MDMP step.
7. Conduct mini-rehearsal to site all Volcano targets as part of the EA development drill with the overwatching maneuver force.
8. Complete PCCs/PCIs early to include communications systems.
9. Conduct rehearsals at all levels. Rehearse timing requirements to include the decision cycle and SCATMINWARNs and SCATMINRECs. Review Volcano plan during all combined arms rehearsals.
10. Battle-track preparation from CL V upload to marking the centerline to DPs/triggers to actual execution.

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ISSUE 6: ***How does the FXXI engineer battalion conduct security operations without dedicated reconnaissance assets?***

DISCUSSION: Creating a reconnaissance element out of organic assets or providing engineer soldier to other reconnaissance units, such as the brigade reconnaissance troop, will further degrade the battalion's ability to execute mobility and countermobility tasks due to the limited number of sappers in the platoon. Furthermore, as the engineer commander is not normally responsible for an AO, the use of ad-hoc engineer reconnaissance element requires extensive operational and logistical coordination. The engineer leader must base his decision to support the reconnaissance effort on a prioritized list of engineer-essential tasks for the given mission. If reconnaissance is an essential task, then the leader develops a plan to execute the mission.

RECOMMENDATION: Support the reconnaissance effort based on the following considerations:

1. If reconnaissance is identified as an essential task during mission analysis, integrate it into the brigade combat team or task force R&S plan.
2. Support with an organic element (squad or platoon).
3. Focus on OBSTINTEL (tactical) or required engineer technical data.
4. Know that the "chief of reconnaissance" for the AO command-controls the engineer reconnaissance element (squad or platoon).✪

CHAPTER 5

The Engineer-Bradley Fighting Vehicle (E-BFV)

by MAJ Aniello L. Tortora, S-3, 4ID Engineer Brigade

To be a relevant force multiplier in the 21st Century Army, combat engineers need a mobile and survivable platform. Engineers are looking at the Eingineer-Bradley Fighting Vehicle as the answer.

Since the mid-1980s, combat engineers have struggled to keep pace with the modernized M1/2/3-equipped forces they support. Too often, CTC rotations demonstrate that engineer equipment is outdated and will not satisfy the demands of 1990's combat nor will it meet the needs of our 21st Century Army.

The M113 is a perfect example:

- **It is slow.**
- **It has a high deadline rate.**
- **It provides little protection.**
- **It serves only as a troop and cargo carrier.**

We are on the doorstep of the 21st Century, and it is now very clear:

The M113 has long outlived its usefulness as a combat engineer troop carrier.

The Army is transitioning from a mechanized to an armored warfare force. In mechanized warfare, soldiers move to an objective in a vehicle and dismount to conduct their mission. In armored warfare, soldiers move on the battlefield in a survivable, firepower-laden platform that allows them to conduct their mission, mounted and under armor. The implication for combat engineers is a need to progress from a sapper-based force to an equipment-based force. Moreover, our equipment must be capable of providing the functions needed to accomplish our mission.

The characteristics of the Force XXI battlefield will demand even more from combat engineers. Like the maneuver forces they support, combat engineers need platforms with speed, versatility, and survivability. Force XXI technologies will allow greater dispersion, enable distributed operations, and will increase the tempo of battle like never before. All these Force XXI enablers put demands on providing mobility to the force unlike any previous doctrinal change. Equipping combat engineers with the Engineer-Bradley Fighting Vehicle is a step in the right direction and essential to the future of combat engineer forces and to the success of maneuver forces.

What follows is a discussion of the initial results of an on-going Bradley Concept Evaluation Plan conducted by an engineer brigade and the United States Army Engineer School. The end-state for the evaluation is to determine if the Bradley is suitable for combat engineers and to determine the advantages and disadvantages of the Bradley as a combat engineer platoon vehicle. Throughout the training and evaluation, the focus of the engineer brigade is to provide the engineer community with feedback in three areas:

☞ **What are the new engineer tactics, techniques, and procedures (TTPs) for conducting combat engineer missions using Bradleys?**

☞ **How is the Bradley vehicle load planned so engineers can carry what they need to execute their combat engineer mission?**

☞ **What type of gunnery proficiency must be achieved by engineers, and how is engineer training balanced with gunnery training?**

Bradley Concept Evaluation Plan

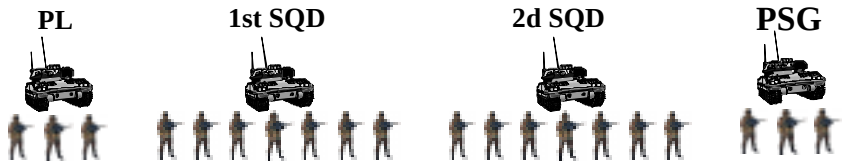
In February 1998, a combat engineer company made history when it fielded nine M2A0 Bradley Fighting Vehicles. The higher engineer battalion received the Bradleys on loan from a National Guard armored division.

The structure of the combat engineer company was minimally changed with the fielding of the Bradley.

☞ **The number of personnel assigned to the combat engineer platoon was decreased to match the force structure authorizations from the Conservative Heavy Division Design MTOE (Engineer platoons go from three squads to two).**

☞ **Bradleys were substituted for the company's M113s.** The company commander received a Bradley, and four Bradleys were assigned to each line platoon: one for the platoon leader, one for the platoon sergeant, and one each for two sapper squads.

SAPPER PLATOON
1-0-19
Two per company



Two points are worth noting regarding the structure of the Bradley engineer company.

1. The engineer Bradley is not referred to as a squad vehicle. Instead, the engineer Bradley is called the Engineer-Bradley Fighting Vehicle (E-BFV). This is in keeping with today's offensively oriented doctrine where the engineer platoon, not the squad, is employed as the basic breach/reduction unit. This is also true of countermobility operations which are more focused on emplacement of scatterable minefields. The engineer platoon sites and marks these obstacles.

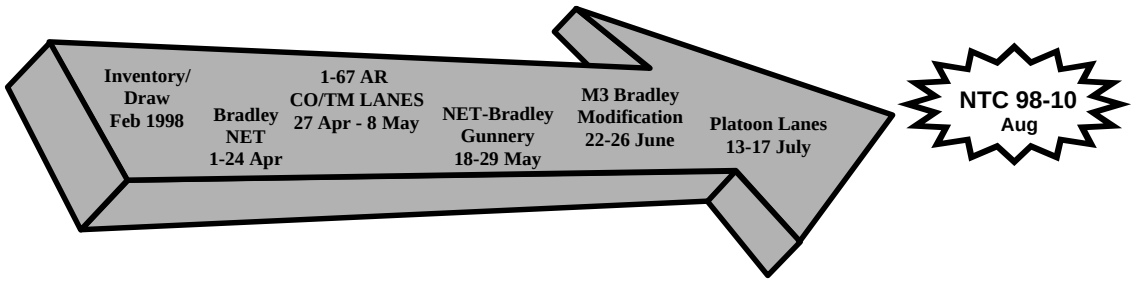
2. The reduction of the engineer platoon from three to two squads was not precipitated by the transition to Bradleys. The reduction in squads is the result of a previously implemented MTOE change and is not linked to Bradley fielding.

The evaluation began in March 1998 with New Equipment Training (NET) and culminated in August 1998 with the unit's participation in a focused rotation at the National Training Center (NTC). The Bradley NET was conducted in two phases:

New Equipment Training

The first phase was conducted in 18 training days and included: driver training and licensing; maintenance training; turret operation and training; gunnery skills training with Unit Conduct of Fire Trainer (UCOFT); and, MILES gunnery training.

Concept Evaluation Plan
BRADLEY ENGINEER FIGHTING VEHICLES



The second phase of the NET was Bradley gunnery qualification. The company completed Bradley gunnery in eight days by first completing Bradley Gunnery Skills Testing (BGST) and UCOFT refresher training the first day, Table V the second day, and then two days each on Table VI, VII, and VIII. Engineers conducted their gunnery in accordance with **FM 23-1, *Bradley Fighting Vehicle Gunnery.*** The engineer company fired practice tables V, VI, and VII and then qualified on the Table VIII. These tables should not be modified for engineers because the tables include the same type of engagements engineers would encounter while conducting engineer missions.

The total NET for combat engineers lasted 26 days. No training was conducted on the TOW weapon system as this was not a weapon system engineers would be expected to use in accomplishing their mission. The NET proved to be fairly easy for combat engineer soldiers and leaders who quickly adapted to new equipment and skills. In addition to the dedicated NET team, the company borrowed other resources to accomplish the training.

A qualified Bradley master gunner was needed at both company and battalion levels to train gunnery skills and to plan, prepare, and help execute gunnery qualification.

The company also required a dedicated UCOFT to prepare for gunnery and maintain gunnery skills.

Between phase I and phase II of the NET, the combat engineer company conducted company/team lanes training with an armor task force to prepare for NTC. The company focused on validating load plans and on the TTPs for conducting missions in offensive and defensive operations. The company took this training a step further by conducting a one-week platoon lanes FTX to further refine the TTPs they would use when executing their mission at the NTC.

Findings

1. Combat engineer soldiers *love* the Bradley because it provides them speed, mobility, protection, and firepower not previously available in an M113.

2. Engineer leaders champion this vehicle because of its versatility and potential.

3. Maneuver forces support combat engineers in Bradleys because E-BFVs can maintain the pace and tempo of maneuver forces and provide enhanced mobility and countermobility support.

4. Row minefield placement was found to be *easier* and more productive in the Bradley than in the M113.

5. The turret and main gun of the Bradley have proven to be extremely valuable to combat engineers and have provided an increase in capability and versatility. Engineers in M113s rely on maneuver forces to protect them, which often drains the already stretched firepower of infantry and armor forces. Bradley Engineers can better protect themselves during movement and provide their own local protection while breaching and reducing obstacles. Thus, the Bradley Engineer Company and Battalion is better suited to perform as a breach force during battalion and brigade deliberate breaches.

6. The E-BFV increases our capability to conduct countermobility operations. While the E-BFV platoon is capable of conducting conventional mining operations, the focus of countermobility effort centers on the rapid emplacement of dynamic obstacles. Engineer platoon-, company-, and battalion-size countermobility organizations can be formed with the capability to operate independently on the battlefield. These organizations comprised of E-BFVs and scatterable minefield systems could protect themselves during movement and while emplacing and marking obstacles.

7. Sustainability is an area where E-BFVs are winners. During a two-week company/team lanes FTX, only one Bradley was deadlined. During the same period, an M113 company had *six* M113s deadlined at various times. Bradleys are more sustainable than M113s for two reasons:

➤ **The M113 is an aging vehicle while the Bradley fleet is relatively new.**

➤ **As we adopt the Force XXI centralized logistics support concept and move from supply-based to distribution-based maintenance, an economy of scale is created through the use of common chassis.**

Although the Bradley is more expensive to maintain than the M113, when the increase in survivability, capability, and sustainability are weighed against cost, the additional cost is more than justified.

8. Another tremendous success story for the E-BFV and combat engineers was gunnery. Confident and motivated engineers conducted Bradley gunnery only six weeks after their introduction to the vehicle, producing astounding qualification scores. All crews qualified on their first attempt (Q1 rating) with one crew qualifying distinguished and two crews qualifying superior. This is a qualification record rarely achieved.

Tactics, Techniques, and Procedures (TTPs)

The engineer company's higher battalion is developing detailed TTPs for the Bradley Engineer Platoon and Engineer Company. Converting from M113s to Bradleys has not generated dramatic changes in TTPs. Most of the TTPs used for operating in M113s translate satisfactorily for operations in Bradleys. In some areas, however, new TTPs are being developed as a result of the enhancements provided by the more survivable and versatile Bradley. For example, TTPs for lane marking and row minefield emplacement require minor modifications.

Mine Plows. The engineer battalion has been experimenting with the use of V-type surface mine plows with the E-BFV. V-type plows have the potential for maintaining mobility of the force enroute to an objective. The blades can clear rubble and skim scatterable mines from level, hard-packed surfaces. They plow well in soft soil where adequate spoil can be maintained before the blade. The blade would be even more useful if it floated along its horizontal axis so it could be employed along semi-level surfaces, such as combat trails. The blade currently does not perform well on uneven surfaces or in rocky soils.

Load Plans. Engineer soldiers have developed standard load plans for the E-BFV which facilitate the successful execution of combat engineer missions. Every piece of platoon equipment was examined to determine what was truly necessary for an engineer platoon in combat. TOW storage racks were removed from the M2A0 Bradley to increase interior space and the exterior was adapted to carry wire, pickets, and tools. Although Bradleys do not have as much interior space as the M113, the E-BFV can carry the necessary engineer equipment for combat. The E-BFV load plans were evaluated during the NTC rotation.

Interior/Exterior Modifications. Engineer soldiers developed plans for modifying the interior and exterior of the Bradley to increase space and utility. Through an agreement with the Bradley Project Manager and the Red River Army Depot, these plans were used to modify an M3A0 (Cavalry Fighting Vehicle). Bench seats with storage boxes were installed in place of the individual seats. Shelves and cabinet-type storage boxes were installed in place of excess TOW racks and ammunition boxes. On the exterior of the vehicle, posts were welded to carry pickets and lane-marking materials, and the trim vane was used to carry concertina wire. Additionally, a larger bustle rack was installed. These were simple and inexpensive modifications that could be completed internal to the battalion. M2 Bradleys can be similarly modified to increase space and function. M2 ODS Bradleys already have more interior space than earlier M2 models as a result of similar modifications.

Added Engineer Functions. The potential exists for adding additional engineer functions to the E-BFV:

➤ **One possibility would be to replace the TOW launcher with a weapon system that employed a high explosive munition similar to the 165mm high explosive "bunker buster" round used by the Combat Engineer Vehicle.** An E-BFV demolition gun could be used to reduce roadblocks and other obstacles.

➤ **Another opportunity would be to design and mount a small Volcano panel on the E-BFV.** Each Bradley engineer platoon would then have a rapid scatterable minefield capability.

Gunnery. The engineer battalion is developing a platoon live-fire table for combat engineers. Bradley Platoon Gunnery for Infantry consists of Table XI, Platoon Practice, and Table XII, Platoon Qualification. The qualification is based on the platoon's ability to execute collective tasks in a live-fire environment. Similarly, the Engineer Platoon Table XII will focus on offensive/breaching operations under live-fire conditions. A Bradley Engineer Table XII will serve as an excellent graduation exercise from platoon lane training. In addition, it will prepare the engineer company to participate in the maneuver task force Combined Arms Live Fire Exercise (CALFEX).

CONCLUSION

The E-BFV has made engineers a more valuable part of the combined arms team. It is the platform from which to launch the combat engineers into the Army After Next. Inexpensive and simple modifications to the Bradley have alleviated load plan fears. Plows and other attachments offer added advantages for the combined arms team and enable the engineer force to move from mechanized to armored warfare. The Bradley increases confidence in our leaders and is the only choice for the survivability of our soldiers. Finally, we have found gunnery not to be a distracter to training and believe it has the potential to improve engineer training by merging gunnery with engineer lane training.✪

CHAPTER 6

Combat Engineer Equipment

by Mr. Joe Call, Mr. Ed Pyatt and CPT Greg Rawlings, United States Army Engineer School

The center of debate within the Corps of Engineers with regard to the Engineer-Bradley Fighting Vehicle (E-BFV) is whether or not it can haul an engineer squad's equipment and troops. This chapter addresses this issue and provides feedback in the following areas:

1. Load Plans.
2. Pearson Surface Mine Plough (SMP).
3. Weapons.
4. Access/Egress.
5. Force Protection.

LOAD PLANS

ISSUE: ***Will the Bradley vehicle, when used as an engineer squad carrier, provide the hauling capability needed by a combat engineer squad?***

OBSERVATION No. 1: An M3 was successfully modified to function as a squad-level E-BFV. See photographs 6-1 through 6-3.

DISCUSSION: One company made modifications to one M3. Their modifications included:

1. Removal of individual seats and installation of M2A2ODS bench seats and a squad box (used as a seat).
2. Retention of M3AO bustle rack (significant storage space increase over M2).
3. Installation of interior box in the left rear (squad used as their demo box).
4. Extended handholds on the left and right skirts for carrying wire and pickets.
5. Removal of all unnecessary interior bins and boxes.
6. Placement of cargo net on interior right side for A bags (duffels).
7. Placement of cargo net on exterior right rear for rucks.

The Engineer brigade S3's unofficial estimate of the cost for these modifications was approximately $5,000. The local Directorate of Logistics (DOL) can make all modifications. The unit welder can complete some of the modifications, further reducing their cost. By the conclusion of the rotation, the unit decided to store all rucks and duffel bags on the outside of the vehicle.

RECOMMENDATION: The modified M3A3 used in this rotation should be used as a base for additional modifications.

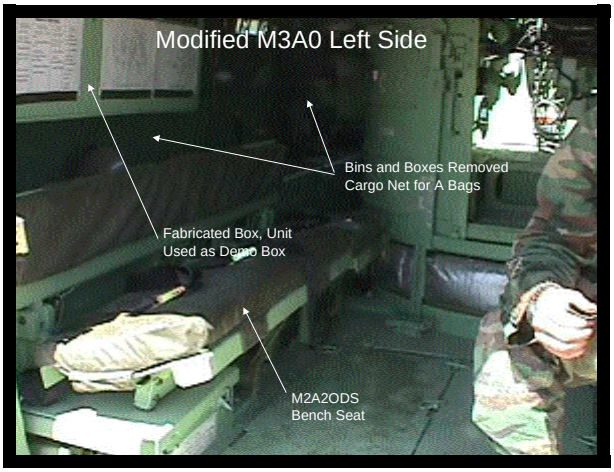


Photo 6-1

Photo 6-2

Photo 6-3

OBSERVATION No. 2: There is no reduction in carrying capacity. In fact, the M3, with modifications, can carry more than the M113.

DISCUSSION:

1. The base M2 BFV was more difficult to load than the modified E-BFV and M113. This is because the BFV is configured to carry an infantry squad and their basic load. This configuration difference is made up of numerous bins and boxes that occupy space that can be better utilized for engineer equipment. E-BFVs could hold mission-essential equipment.

2. The most noticeable difference between the M113 and the E-BFV is the loss of the M105 trailer. Elimination of the M105 trailer reduces the ability to haul Class IV and Class V supplies, both mission and basic loads, and specifically mines. With the Conservative Heavy Division (CHD), however, hauling capability is not as big a concern as before because the CHD is not designed to conduct a deliberate defense without significant assistance from Corps. On the ground, the emphasis of the divisional engineer's counter-mobility is shifted from conventional minefields to scatterable minefields. The Volcano systems in an engineer company can more than make up for this deficiency in a hasty defense, providing the control supply rate (CSR) for Volcano reloads supports it.

RECOMMENDATION: To provide the engineers with adequate carrying capacity, the E-BFV should be modified for carrying engineer equipment. Add one HEMTT cargo truck to the Force XXI mechanized platoon MTOE to carry pickets and wire for minefield fratricide prevention fences. This also requires two 12B10 soldiers.

★★★

OBSERVATION No. 3: At the end of their NTC rotation, one fourth of the engineer soldiers that were issued *unmodified* M2 Bradleys at the start of their NTC rotation said they would prefer the M113 as the engineer squad vehicle.

DISCUSSION: When the Test and Evaluation Coordination Office (TECO) first surveyed engineer soldiers, they were 100 percent in favor of the Bradley as the engineer squad vehicle. At the end of the rotation, a repeat survey indicated that 25 percent favored the M113. The primary reason given was lack of storage space in the unmodified Bradley. ***The soldiers in the* modified M3 Bradley *remained 100 percent in favor of the Bradley as the engineer squad vehicle.***

RECOMMENDATION: Modifications for additional storage capacity are required to the interior and exterior of the M2 Bradley to make it more suitable to the engineers as an engineer vehicle.

★★★

OBSERVATION No. 4: There is no means for carrying the modular pack mine system (MOPMS) on or in the E-BFV.

DISCUSSION: Carrying MOPMS on or in the E-BFV, especially a squad vehicle, is a problem. If MOPMS is carried inside the E-BFV, on the floor, there is no room for the squad to ride.

RECOMMENDATION: A means to carry the MOPMS on the Bradley's exterior should be developed. A suggestion is to install a mounting bracket on the troop hatch. This bracket should not be used as a permanent storage location, but rather as a means for moving the MOPMS from the mine dump or Class IV/V point to the mission site.

★★★

OBSERVATION No. 5: Squad load plans and sets, kits, and outfits (SKOs) consisted of only mission-essential equipment based on missions expected in the theater of operations. The engineer squads did not carry or plan for the use of other equipment authorized to an engineer platoon.

DISCUSSION: The engineer squads mounted in E-BFVs did not load or bring all MTOE equipment. Essentially all that was loaded was equipment for expected mobility and counter-mobility tasks (demolition sets, minefield marking sets, mine detectors, picket pounders, and select pieces of the pioneer tool kits). Also loaded were general mission and life support items such as fuel cans, water cans, coolers, and cots. The modified M2 had sufficient space for this equipment plus five dismounts (potentially six dismounts with the extension of the squad box located right rear interior). There was not sufficient additional space for all of the other SKOs required by MTOE (sketch set, carpenter's tool kit, and full pioneer tool kit).

RECOMMENDATIONS:

1. Mission-essential equipment should be clearly delineated based on the organizational concept and operating methods for the unit, and only mission-essential equipment should be carried on the E-BFV.
2. Consider two courses of action (COA) for the other equipment authorized to an engineer platoon:
   a. COA 1: Identify additional haul assets and make coordination for the transportation of the additional equipment.
   b. COA 2: Evaluate and clearly define the mission parameters of an engineer platoon and remove the equipment that is not consistent with these parameters. For example, do we really want a mechanized engineer platoon to be capable of vertical construction? If not, then remove the carpenter's tool kit from the MTOE.

PEARSON SURFACE MINE PLOW

ISSUE: ***What is the impact of the Pearson Surface Mine Plow (SMP) on the mobility and operational performance of the E-BFV?***

NOTE: Recognizing a deficiency in capability due to reduced manpower (Force XXI strength) and lack of future enablers (Grizzly), Engr Bde, 4th ID, acquired four Pearson SMPs and deployed with them to their NTC rotation.

Bottom Line Up Front: The Pearson Plow is designed to skim the surface of a flat roadway or trail, not to defeat buried mines. The Canadian Army, its designer, use the SMP as a tool to reduce a lane in a surface scatterable minefield. Little statistical data is available on its capabilities. There are no results of any dynamic testing to measure its effectiveness and ability to remain functional after one or more mine detonations of varying types. The Pearson SMP is a developmental system that will undergo further testing next year. Observations made here are not based on true developmental or operational testing and should only be considered within this context. Beyond the brief description given here, little was known about the system before the rotation, and after the rotation more questions remain than answers. The unit had some success in using the plow during rehearsals, but was not successful at any other time during the rotation.

OBSERVATION No. 1: The Pearson SMP has generally about the same mobility affect on the E-BFV as the mine plow has on an M1.

DISCUSSION: The SMP causes some mobility restrictions to the E-BFV.

1. In the traveling configuration (see Photo 6-4 below), the E-BFV can maintain requisite speed but does suffer a reduction in acceleration. It is less capable of negotiating broken terrain (moguls and wadis), and must do so at a reduced speed.

2. The most significant mobility loss occurs when the SMP is placed into the plowing configuration (see Photos 6-5 and 6-6, page 43). In this configuration, the wing sections of the plow are lowered and the plow is not restrained, allowing it to pivot horizontally. The pivoting plow makes it necessary for the operator to negotiate terrain *much* more slowly. Ideally, the SMP is placed in the plowing configuration while in the assault position. As such, the route from the assault position to the minefield must be trafficable for the SMP in the plowing configuration. If the route is not trafficable, then the SMP must be moved to or near the minefield before being put into the plowing configuration.

3. Other considerations relative to the SMP are:
   a. Operator training.
   b. Fuel consumption.
   c. Ability of the Bradley's engine and transmission to withstand the strains of operational use.
   d. Ability of the engineers to successfully use it to reduce a lane in scatterable minefields, since this was not done during the NTC rotation.

RECOMMENDATION: If the Pearson SMP is shown to be capable of reducing a lane in a scatterable minefield, it should be considered as a tool for divisional engineers to use in support of division maneuvers. Commanders, Bradley Commanders (BCs) and E-BFV drivers must be aware of, and plan for, the reduced mobility and other limitations that the SMP will impose on their engineer vehicles.

Photo 6-4

Photo 6-5

Photo 6-6

OBSERVATION No. 2: The blackout lights illuminate and white out on the SMP.

DISCUSSION: Drivers were forced to move without blackout drive to be able to see beyond the SMP.

RECOMMENDATION: If the SMP is employed, the blackout drive must be relocated to allow the driver to see at night.

★★★

OBSERVATION No. 3: The Pearson SMP will mount on an E-BFV without major modifications.

DISCUSSION:

1. Mounting bracket requires drilling holes in armor for A0 models. A2 models use existing applique armor holes. (See Photos 6-7 through 6-10).

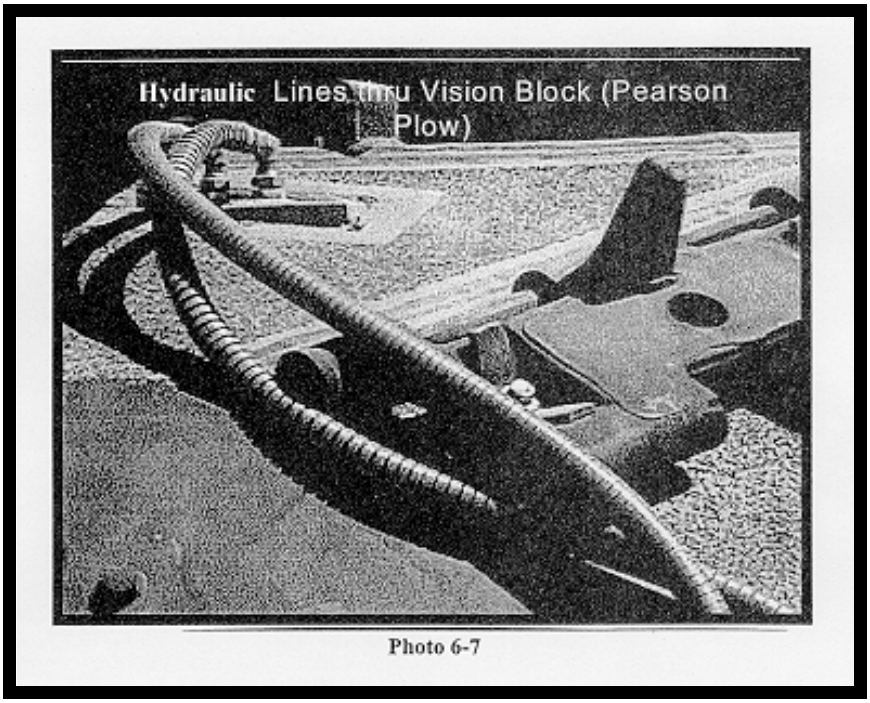


Photo 6-7

Figure 6-8

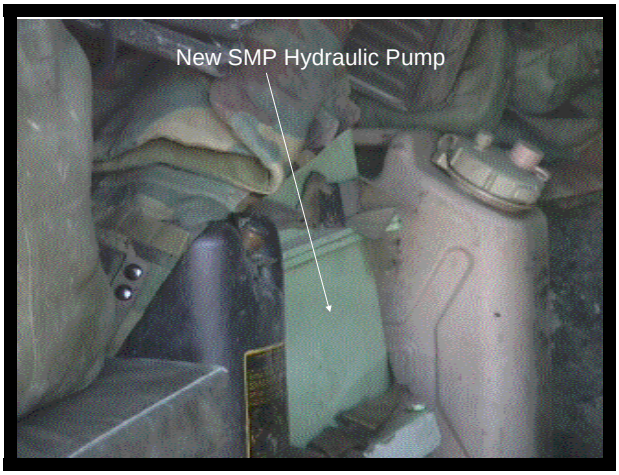


Photo 6-9

Figure 6-10

2. The unit issued two SMPs per platoon. The SMPs were mounted on the platoon leader's and platoon sergeant's E-BFVs. The decision for two plows was based on the fact that one plow does not reduce a lane wide enough for an M1 to safely transit. The TTP calls for an initial pass to reduce the lane and a second pass with the nose of the plow on the track path of the first to widen the lane to allow for M1 traffic (see Figure 6-1).

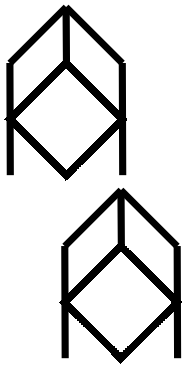


Figure 6-1

The allocation of the plows to the platoon leader's and platoon sergeant's E-BFVs facilitated the marking of the lane by the squads. This appears to be a logical solution but other alternatives should be explored, such as both on squad E-BFVs or one on a leader E-BFV and one on a squad E-BFV.

RECOMMENDATIONS:

1. The minor modifications needed to mount the Pearson SMP on the Bradley should be made with in-house resources.
2. Based on the lane width required for an M1 tank, two SMPs per platoon is a valid basis of issue.

★★★

OBSERVATION No. 4: Two of the Pearson SMPs were non-mission capable (NMC) for approximately 12-18 hours because of cracks in the A frame.

DISCUSSION: The SMPs began cracking and buckling at the A frame because of improper stowage of the SMP for movement (see Photos 6-11 and 6-12, page 47). The SMP is equipped with chains that prevent it from pivoting horizontally. When the chains were not used, the SMP pivoted wildly putting unintended stress on the A frame causing it to crack. The unit welder was able to fix the cracks and shore up the buckling (see Photo 6-13, page 47). Once the repairs were made, the unit followed its SOP for connecting the chains and also improvised an additional support chain to further secure the SMP during movement.

RECOMMENDATION: When not in use, the mounted SMP must be stowed properly for movement using the chains provided. Avoid excessive speeds during movement.

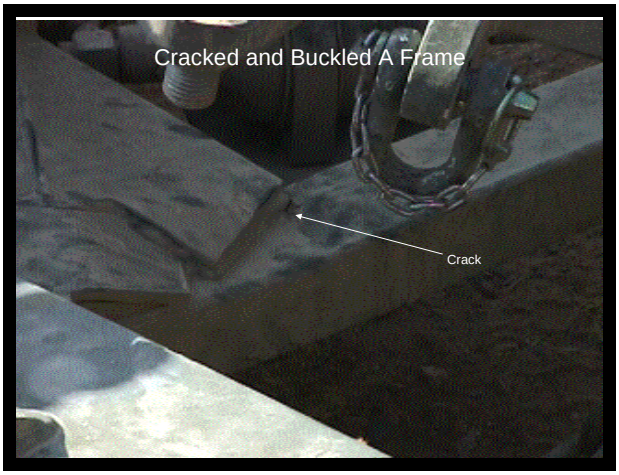


Photo 6-11

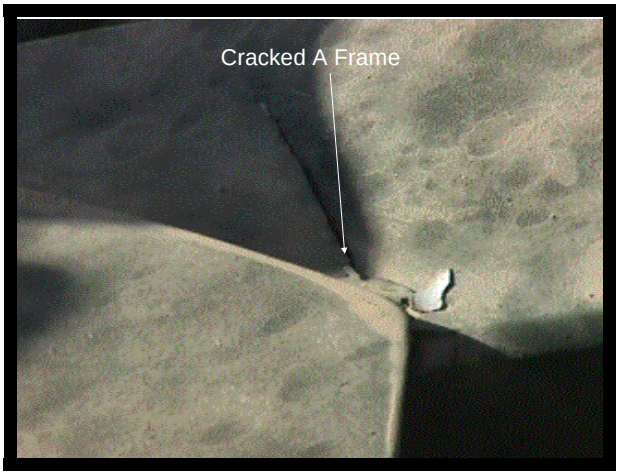


Photo 6-12

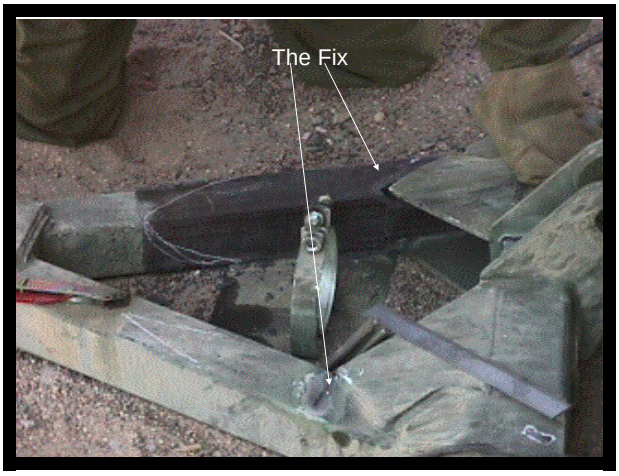


Photo 6-13

WEAPONS

ISSUE: ***Are engineer units able to effectively employ the combat capabilities of the E-BFV and fight as part of the maneuver force?***

OBSERVATION: The engineer unit was unable to react to enemy contact and continually did not survive long enough to arrive at the point of penetration.

DISCUSSION:

1. The E-BFV provides considerably more firepower to the combat engineers, which is only beneficial when the system is properly and effectively employed. During the rotation, the engineer unit fired approximately 600 rounds of 25 mm, with a BDA of one HIND-D. Engineer units are not familiar with the task of developing and executing a direct fire plan. They are accustomed to traveling inside a company/team or task force formation and routinely leaving direct fire planning and execution to the tankers and infantrymen. With the firepower provided by the E-BFV, engineers must learn to react to enemy contact and engage the enemy as part of the maneuver force.
2. This is not an E-BFV-unique issue. Direct fire planning, movement techniques, and movement formations are equally applicable to M113s. The need for skill in conducting these basic combat tasks is compounded by the fact that engineers assume their own security in the Force XXI organization. With the loss of one company/team, task forces are no longer capable of protecting engineer movement while engaging the enemy. Mounting engineers in E-BFVs will help to fill the gap created by the missing company/team, but the engineers must be proficient in using the capability of the E-BFV if they are going to *fight* as engineers.

RECOMMENDATION: Regardless of their carrier, engineers must develop and execute a direct fire plan and use the appropriate movement techniques and formations. Engineers need to be trained along with combat arms soldiers in actions on contact drills.

ACCESS/EGRESS

ISSUE: ***Is access and egress of the troops through the hatches of the E-BFV impeded, or does it require any procedural changes?***

OBSERVATION: The use of the Bradley as the squad engineer vehicle resulted in no modifications to access/egress procedures for the engineer squad.

DISCUSSION:

1. Part of the feasibility of the E-BFV for combat engineers is access and egress. Access and egress of the troops through the hatches of the Bradley are not impeded. It took an average of 15 seconds to upload the crew when the order to move was given. Egress took an average of 5 seconds. These are crew access and egress times only and do not include the time taken for loading or unloading the equipment.
2. Safety and rollover have not been affected. The platoons are conducting rollover drills just as they do with the M113.

RECOMMENDATION: Access and egress procedures for the E-BFV can remain essentially the same as they are for the M113.

FORCE PROTECTION

ISSUE: ***What is the impact of the E-BFV on force protection of the engineer unit?***

OBSERVATION: When presented with M113s and E-BFVs as potential targets, the OPFOR chose to shoot at the E-BFV every time.

DISCUSSION:

1. Both combat and test data conclude that because of the increased armor protection, speed, and firepower, the Bradley can survive better on the battlefield. The increased speed enhances the ability to maneuver with the combat forces and increases survivability through protection from those weapons systems. The increased firepower of the TOW and 25mm cannon will increase the ability to defend the squad and, therefore, increase survivability.

2. Although the Bradley is more survivable than the M113, it is also a more valuable target. The engineer unit must be prepared to take appropriate action and protect itself. The Bradley Engineer crews must be trained to fight the Bradley as a weapons system. The crews must be trained in fire and maneuver as well as in marksmanship, direct fire planning, scanning, target acquisition, and operator maintenance.

3. Photos 6-14 and 6-15 on page 50 were taken during the live-fire deliberate attack. The unit started the rotation with the typical "ducks in a row" formations, seen all too often. As the rotation continued, the unit became much better at movement formations and scan plan. The pictures show the combat engineer platoon moving in a wedge formation. The tank is the same vehicle in both photos. Notice the breakdown in the formation as they moved. These illustrations are typical of shortfalls of mechanized engineers as a whole. Engineers are accustomed to moving *inside* of someone else's maneuver formation, not *being* the formation. Engineers must relearn this basic combat skill.

RECOMMENDATION: With the increased capabilities of the Bradley comes an increase in the training requirements to enable the engineer crews to take advantage of those capabilities and learn the combat skills necessary to protect themselves. The officer and NCO education systems as well as the 12B AIT course should be modified to include training in fighting the Bradley.

CONCLUSION

The purpose of the focused rotation at NTC was to look at the feasibility of the Bradley as an engineer squad vehicle. This chapter discussed the equipment portion of this question. The significant findings are:

1. With some minor modifications, the Bradley will work well as an engineer vehicle.
2. The MTOE authorization of Sets, Kits, and Outfits for the engineer squad and platoon must be reassessed.
3. The developmental Pearson Surface Mine Plow (SMP), if fielded, has potential for divisional engineers to use in support of division maneuvers.
4. The E-BFV puts engineers back in the fight, so engineers must be trained and ready to fight as combat soldiers.
5. Access and egress of the troops through the hatches of the Bradley are not impeded.
6. The E-BFV is a higher value target than the M113; engineers must be trained in the skills necessary to protect themselves in close combat.✪

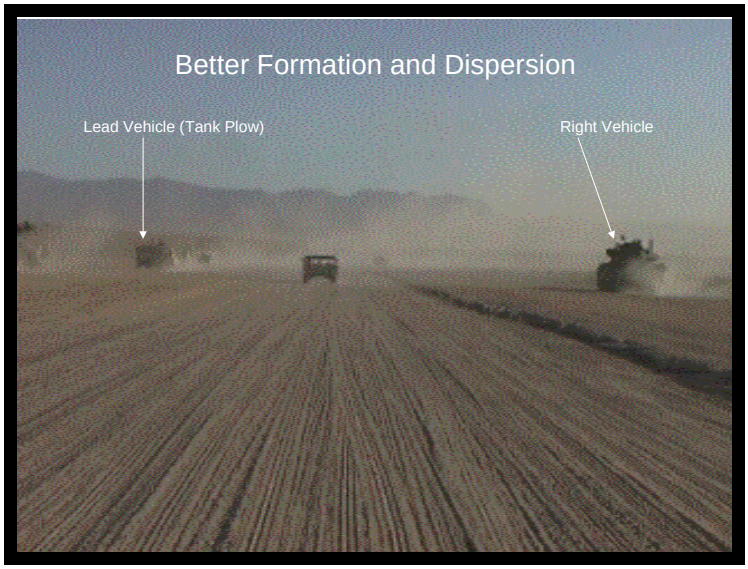


Photo 6-14

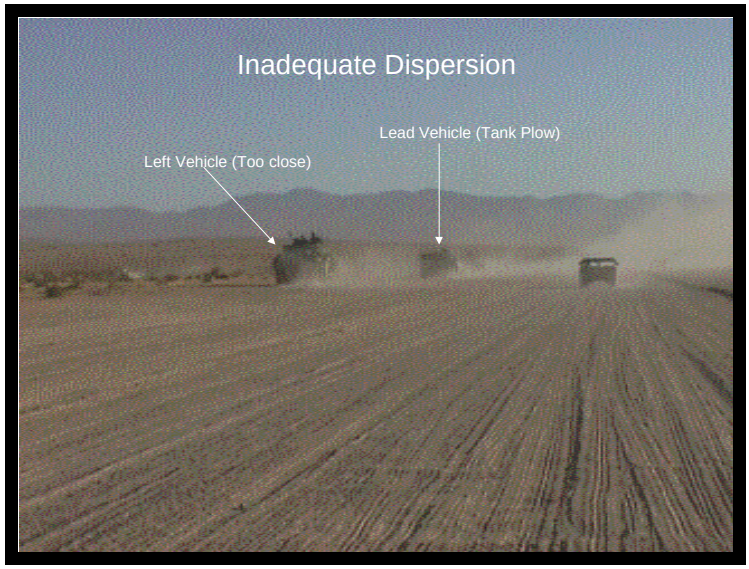


Photo 6-15

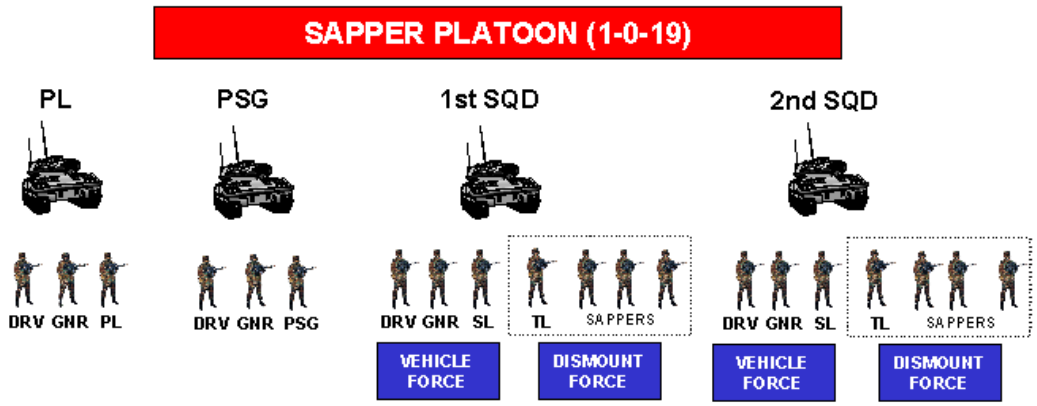
CHAPTER 7

Manning the Bradley Engineer Platoon

by CPT Don Ollar, United States Army Engineer School

Although heavy combat engineers will transition to an armored force under Division XXI, the engineer mission will remain unchanged – they will continue to provide mobility, counter-mobility, and survivability support to the maneuver force. As heavy division engineers field the Engineer-Bradley Fighting Vehicle (E-BFV) to replace the M113, the engineers will need to revise tactical procedures and engineer-specific battle drills to compensate for the new fighting platform and the restructured TOE.

Unlike the M113, the E-BFV requires a dedicated, three-soldier crew to drive the vehicle and operate the weapon systems. The draft TOE for an E-BFV engineer platoon allows for one officer and 19 enlisted soldiers (see figure below). In an engineer platoon equipped with four E-BFVs, 12 of the authorized 20 soldiers remain with the vehicles, leaving eight soldiers to execute dismounted missions. The engineer challenge is to man the Bradleys while simultaneously maintaining the ability to execute engineer missions. This chapter addresses the limitations of the E-BFV engineer platoon organization and offers techniques for the platoon's tactical employment.



OBSERVATION No. 1: *The E-BFV engineer platoon organization is barely adequate for the construction of conventional obstacles. The engineer squad is too small to execute this mission.*

DISCUSSION: A fully-manned E-BFV engineer platoon with two Sapper squads is able to dismount eight soldiers to construct conventional obstacles, such as hand-emplaced minefields, triple-standard concertina fence, and 11-row wire road block. This is based on the assumption that each of the four E-BFVs is manned with a driver, gunner and vehicle commander. Comparatively, a fully-manned M113-equipped engineer platoon with three Sapper squads is able to dismount 18 soldiers.

LESSONS:

1. In general, counter-mobility missions previously executed by squads will require an E-BFV platoon, and previous platoon missions will require an E-BFV company with additional augmentation.
2. The E-BFV engineer platoon is the smallest engineer organization capable of effective conventional obstacle emplacement. The E-BFV engineer squad is too small.
3. Given the engineer manpower limitation, supported maneuver battalions must augment soldiers to the E-BFV engineer company for conventional obstacle emplacement. Additionally, maneuver battalions must expect fewer conventional obstacles over a given time period.
4. Assign the E-BFV engineer company the most specialized tasks and the critical obstacle groups. The maneuver companies assume responsibility for protective obstacle emplacement (within 500 meters of the unit battle position) and directed, tactical obstacle emplacement.
5. Maneuver units must effectively plan for and execute scatterable mine emplacement (MOPMS, Volcano, RAAMS/ADAM) to compensate for the loss of conventional obstacle capability.

★★★

OBSERVATION 2: The squad leader in an E-BFV engineer squad is more effective when he is able to dismount the E-BFV.

DISCUSSION: The E-BFV requires a dedicated, three-soldier crew to operate the vehicle and its weapon systems. If the engineer squad leader is a Bradley commander (BC), his ability to dismount the vehicle to lead soldiers in combat is limited.

LESSONS:

1. Assign the team leader or other 12B20 within the squad as the BC. Absent an NCO, assign a senior enlisted soldier as the BC.
2. The “crew concept” is critical. Maintain crew continuity and ensure that the crew is qualified on all E-BFV crew tasks.

OBSERVATION No. 3: ***The E-BFV engineer platoon is not able to conduct all the row-mining functions simultaneously.***

DISCUSSION:

1. Row minefield emplacement consists of four primary functions:
   - **Siting and Recording**
   - **Marking**
   - **Mine Dump Operations**
   - **Mine Laying**

2. A dedicated party executes each mine-laying function. In the old three-squad combat engineer platoon, the dedicated parties are able to execute these functions simultaneously. For example, the marking party installs the perimeter fence while the mine dump party uncrates and prepares mines for emplacement. The only constraint is mine emplacement – mines cannot go on the ground until the minefield is marked.

3. The E-BFV engineer platoon, however, is unable to conduct simultaneous, row-mining functions. Each function must be executed sequentially by the entire platoon.

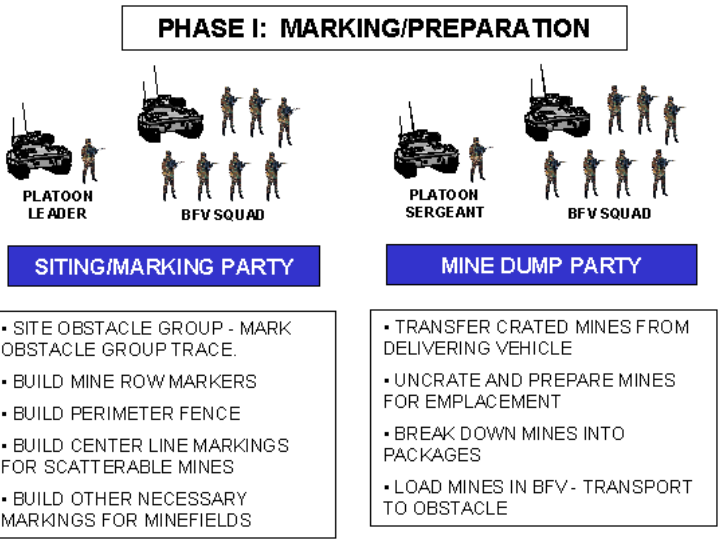
RECOMMENDATIONS:

1. When the E-BFV engineer platoon is not augmented with additional troops, they can use the following suggested row minefield battle drill. The procedures and unit organization follow the guidelines and standards established in **FM 20-32,** ***Mine/Countermine Operations.***

2. The E-BFV engineer platoon organizes into four parties:
   - **Siting and Recording**
   - **Marking**
   - **Mine Dump Operations**
   - **Mine Laying**

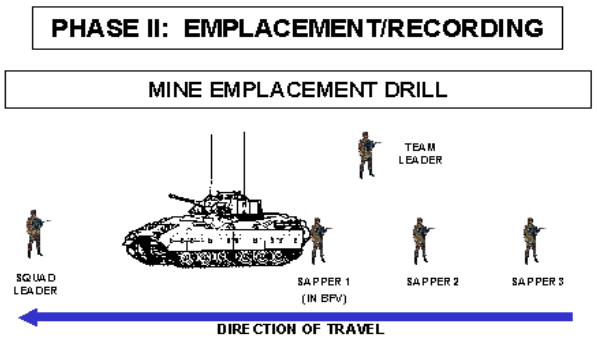
3. The execution of the row-mining operation can be divided into two phases:

Phase 1- Preparation – Siting, Marking, and Mine Dump operations. During the preparation phase, the E-BFV platoon organizes into two distinct working parties that execute the functions listed on page 7-4:



The platoon leader designates a recorder to complete a DA Form 1355 for each minefield. During the mine emplacement phase, the recorder receives information from the mine-laying party NCOIC and completes the forms for submission.

Phase II – Mine Emplacement and Recording. Upon completion of mine preparation at the mine dump, the mine dump party, under the platoon sergeant's supervision, moves to the sited obstacle group and transitions to mine laying. During the execution of row-mining, the E-BFV squad organizes the mine-laying party as shown below:



SQUAD PERSONNEL FUNCTIONS

SQUAD LEADER	OVERALL IN CHARGE. CONTROLS VEHICLE MOVEMENT.
TEAM LEADER	SUPERVISES DISMOUNTS. REMOVES TEMP MARKERS.
SAPPER 1	RIDES IN REAR OF BFV. FEEDS MINES TO SAPPER 2
SAPPER 2	EMPLACES MINES; ENSURES PROPER SPACING
SAPPER 3	FUSES MINES, PREPARE MINES FOR ARMING

After the marking party (E-BFV squad) completes all obstacle group and individual minefield marking requirements, the squad is available to execute row-mining. The platoon sergeant supervises the row-mining process. If a row of mines is to be buried, the mine-laying party makes a second pass to dig in and bury the mines.

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OBSERVATION No. 4: A single E-BFV is able to transport the following loads:

1. One row of M21 mines for a turn/block minefield (84 mines). Mines must be unfused and placed on their side for transport.
2. Mines for one disrupt minefield (42 M21; 84 M15). Mines must be placed on their side for transport.
3. Fifteen rolls concertina wire carried on the trim vane.
4. Thirty medium/long pickets with side-handle modification (See picture below).✪

CHAPTER 8

UNIT TRAINUP

by MAJ Thomas Roth, Center for Army Lessons Learned

In August 1998, a battalion of engineers deployed to the National Training Center (NTC) to participate in Rotation No. 98-10 with an infantry division brigade. Engineers always deploy to NTC, but in this particular case, an M2 Bradley-equipped company augmented the engineer battalion. For this particular engineer unit, Rotation 98-10 was the capstone event of a trainup that began back in February 1998 when they drew nine Bradleys—dubbed the Engineer-Bradley Fighting Vehicle (E-BFV)—from a National Guard Armored Division.

The introduction of the E-BFV to the combat engineer battalion brought significant challenges for the battalion leaders.

➤ **Battle drills, training plans, service support and other techniques associated with the M113 engineer force had to be re-evaluated and modified.**

➤ **Crews had to be trained and qualified on all aspects of the E-BFV.** This implied qualification on Bradley gunnery tables and the associated intermediate tables leading to a gunnery qualification.

➤ **The transition from M113 engineer force to an armored engineer force required leaders to look at the tactical employment of combat engineers on the battlefield – particularly in the Force XXI context.** With the reduction of one company in a maneuver battalion, the Bradley-equipped engineer company brings significant direct fire "punch" to the supported battalion.

Given these issues to deal with, the infantry division engineer brigade (DIVENG) planned and executed an intensive training plan to get their engineer company combat ready. The company training leading up to the NTC rotation consisted of the following major events:

I. New Equipment Training (NET).
II. Company Situational Training (STX) Lanes.

I. *New Equipment Training (NET):*

The Bradley NET Team conducted a 26-day Bradley NET for the engineer company. They executed the training in two phases:

PHASE I – 18 days

- **Driver training and licensing.**
- **Maintenance training.**
- **Turret operation training.**
- **Gunnery skills training with the Unit Conduct of Fire Training (UCOFT).**
- **MILES gunnery training.**

Lessons:

✔ **E-BFV-equipped engineer battalions require master gunners at the company and battalion levels to provide expertise and to assist in the planning, preparation and execution of Bradley gunnery.**

✔ **Engineer units require MILES II-certified noncommissioned officers.**

✔ **E-BFV-equipped engineer battalions require one dedicated UCOFT for each battalion.**

✔ **Prior to the NET, engineers need to acquire inert 25mm rounds and other specific equipment (cleaning kits, replacement parts) for the 25mm gun.**

✔ **Coordinate for gun stands for the company to conduct weapons training and to pull maintenance on the 25mm gun.** If unavailable, gun stands can be fabricated.

PHASE II – 8 days

Phase II of Bradley NET consisted of training and qualification on level II gunnery tables in accordance with **FM 23-1, *Bradley Fighting Vehicle Gunnery.*** Specifically, the engineer company executed practice tables V, VI, VII and qualified on Table VIII. Engineer E-BFV crews did not qualify on the TOW system, nor did they fire Bradley Tables XI (Platoon Practice) and XII (Platoon Qualification). Prior to Table V, each crew completed Bradley Gunnery Skills Testing (BGST) and UCOFT refresher training.

Lessons:

✔ **Engineers do not need to modify gunnery tables V, VI, VII or VIII outlined in FM 23-1.** Tables reflect the likely engagements engineers will encounter on the battlefield.

✔ **Combat engineer soldiers quickly adapted to the E-BFV.** All Bradley engineer crews qualified on their first attempt.

✔ **Engineer units require FM 23-1, *Bradley Fighting Vehicle Gunnery,* to conduct gunnery.** This manual can be downloaded from the internet by accessing the Army Doctrine and Training Digital Library (ADTDL). This web site can be accessed through the Army Home Page or the CALL Home Page http://call.army.mil/call/homepage/trngdoc5.htm). To download FM 23-1, the requester must first register with ADTDL.

✔ **Anticipate and coordinate for external support, training areas, ranges and ammunition requirements early.**

✔ **Position at least one UCOFT at the range for crews to practice gunnery drills.**

✔ **Engineer units do not have authorization for Bradley turret mechanics (MOS 45N) and must request turret mechanic support early.** Additionally, engineer units do not maintain Bradley repair parts.

✔ **Engineers lack experience running Bradley ranges.** Request Bradley NET Team support the initial unit gunnery by providing the Bradley Crew Evaluators.

✔ **Infantry Table XII in accordance with FM 23-1 does not sufficiently address engineer-specific tasks.**

✔ **To train engineer platoon operations, engineers need to develop a Table XII gunnery that maintains applicable attack and defend combat drills in *ARTEP 7-7J-DRILL* while integrating combat engineer requirements.** Specifically, an engineer Table XII allows for breaching drills and countermobility drills from ***ARTEP 5-145-DRILL.*** (See the proposed "Engineer BFV Table XII Qualification" course of action beginning on page 8-4.

II. ***Company Situational Training (STX) Lanes:***

After completing NET, the Engineer Battalion participated in company STX lanes with the armor battalion it would support at the NTC. The engineer company provided an E-BFV platoon to support both the Company Defense Lane and the Company Attack Lane.

During the ***defense lane,*** the engineer platoon executed engagement area development and obstacle emplacement in support of the maneuver company. On several lane iterations, the platoon had Volcano available to develop the engagement area.

Lessons:

✔ ***Obstacle Emplacement:*** The reduction of the engineer platoon from three squads to two squads significantly reduced the quantity of conventional obstacles that the engineers could build.

✔ ***Class IV/V Points:*** Because of the demand for engineer expertise for obstacle emplacement, the maneuver unit provided the soldiers for the class IV/V points and for mine dumps. The engineer platoon provided one soldier to supervise the breakdown of materials into configured packages.

✔ ***Command Support Relationship:*** The command support relationship must be clearly defined and understood by the supported unit and the engineer platoon. In several cases, the maneuver commander assigned the E-BFV platoon a battle position to defend once the obstacles had been completed. In the context of battalion-level operations, company STX lanes distort engineer mission requirements. During battalion-level defensive operations, engineer platoons provide countermobility support throughout the depth of the battalion battle space.

✔ ***Volcano/MOPMS:*** Because of the reduced number of Sappers to build conventional obstacles, units increasingly relied on scatterable mines (Volcano/MOPMS) to shape the battlefield.

On the ***deliberate attack lane,*** the combat engineers supported the maneuver companies with an engineer platoon and AVLMs (MICLIC launchers mounted on an AVLB M60 chassis).

Lessons:

✔ **Engineers need to train "survive-to-fight" skills.** Specifically, the E-BFV Sapper platoons demonstrated inexperience in actions of contact with fires and movement techniques.

✔ **Engineers are more confident in their ability to stay with the combat maneuver units, execute their mobility functions and survive the battle.**

✔ **Successful execution of breach fundamentals – Suppress, Obscure, Secure, Reduce (SOSR) – at the company level are essential for a successful breach.** The maneuver company must designate support, breach and assault forces in accordance with **FM 90-13-1,** ***Combined Arms Breach Operations,*** and rehearse the operation in detail.

In summary, the engineer company executed an intense trainup leading to the unit's deployment to the NTC. The unit's training experience and the lessons learned provide a model for engineer battalions that transitions from the M113 to the M2 Bradley. The following is a proposed trainup schedule for this transition:

"PROGRESSION IN TRAINING" FOR ENGINEER BATTALIONS

New Equipment Training (NET):

- **Engineer Platoon CollectiveTraining – "Return to Basics."**
  - ➤ Mounted Breach Drill.
  - ➤ Dismounted Breach Drill.
  - ➤ Engagement Area Development.
  - ➤ Actions on Contact with Fires.
  - ➤ Movement Techniques.
  - ➤ Movement Formations.
  - ➤ Scanning.
- **Bradley Gunnery Tables V – VIII.**
- **Combined Arms Training – Company STX Lanes.**
  - ➤ Deliberate Attack/Breach (Engineer company provides command and control for the breach force).
  - ➤ Defend.
  - ➤ Movement to Contact. Engineers following countermobility missions:
    - ✔ Emplace Volcano.
    - ✔ Emplace MOPMS.
- **Modified Bradley Gunnery Table XII.**
- **Combined Arms Training – Maneuver Battalion STX Lanes.**

Although not addressed above, engineer-specific individual skills and squad collective tasks must also be trained and maintained throughout the training cycle.

The following is a proposed course of action for E-BFV Table XII qualification.

★★

ENGINEER BFV TABLE XII QUALIFICATION

"The METL is based on the wartime mission; the unit must train as it plans to fight."
FM 25-101, *Battle-Focused Training*

"These live-fire exercises must be developed based on the unit's METL.
The focus is that the platoon must be qualified to execute the expected wartime missions."
FM 23-1, *Bradley Fighting Vehicle Gunnery*

The introduction of the Engineer-Bradley Fighting Vehicle to engineer battalions creates the requirement for engineer leaders to develop a system to train the E-BFV platoon in its expected wartime missions. Unlike the M113-equipped engineer platoons that are armed with the M2 .50 caliber machine gun, the E-BFV engineer platoon, equipped with 25mm chain guns, M240 coax machine guns, and TOW launchers, brings significant direct fire capability to the battlefield. With the reduction of one tank or infantry company in each Division XXI battalion, the E-BFV-equipped engineer company may be called upon to fill the vacuum. The engineer platoon must be able to execute platoon-level operations and effectively employ the Bradley weapon systems against an enemy. The extent of Bradley gunnery qualification for an engineer platoon to be considered combat ready is less obvious, and debatable. The engineer platoon's primary mission is to provide mobility and countermobility support to maneuver units.

The Bradley Table XII, Advanced Platoon Qualification, in **FM 23-1,** ***Bradley Fighting Vehicle Gunnery,*** Chapter 12, is designed to evaluate the combat readiness of an infantry platoon, but it is unsuitable for the E-BFV-equipped engineer platoon. To assess an engineer platoon's combat readiness based on unit METL, engineers must develop a modified Table XII that retains the target engagements that an engineer platoon would likely encounter in combat while integrating engineer-specific tasks derived from the METL.

ASSUMPTIONS

Fielding of the Bradley by combat engineers will require Army leaders to redefine the engineer battlefield function. The Bradley is a system designed for infantry operations - characterized by close, violent, direct and indirect fire engagements with an enemy. Theoretically, a commander could substitute an E-BFV engineer company for an infantry company and expect minimal degradation to the battalion's combat effectiveness. Future employment of combat engineers in a direct fire role is speculative and undefined. Under current doctrine, combat engineers are a combat multiplier -- providing mobility, countermobility and survivability support to maneuver forces. This condition has not changed. Because of the limited availability of combat engineers on the battlefield, they are rarely deliberately committed to the direct fire fight.

Without a clear understanding of the future mission for combat engineers, assumptions must be made for the development of an Engineer Table XII qualification. These assumptions, derived from current doctrine, help to "focus" the training event -- combining engineer missions with platoon-level gunnery.

Before proposing a specific course of action for an engineer platoon Table XII gunnery, the following assumptions are made:

ASSUMPTION No. 1: **Engineers have a reduced requirement for direct fire engagements on Table XII compared to an infantry unit.**

DISCUSSION: An engineer unit has a different METL than an infantry unit. The paramount mission for an infantry platoon is to close with and destroy the enemy. For an engineer platoon, the primary mission is to provide combat engineer support. In addition to gunnery, an engineer platoon must be evaluated on its ability to execute engineer missions under combat conditions. An engineer Bradley Table XII must have a "balance" of engineer platoon tasks and gunnery tasks.

RECOMMENDATION: Reduce the number of direct fire engagements for an engineer Table XII. Modify the target arrays to replicate the most likely engagements that an engineer platoon will encounter.

ASSUMPTION No. 2: **Engineers do not need to fire the TOW missile in Table XII gunnery.**

DISCUSSION: Although possible, engineer platoons are not expected to exchange long-range, direct fires with enemy tanks. Under current doctrine, infantry platoons close with and destroy enemy forces, whereas the engineer platoon provides combat engineer support. Within the context of combined arms operations, both offensive and defensive, engineer units typically have combat units forward. Even during a deliberate breach, if the mission is executed properly, the enemy is suppressed and incapable of effectively engaging the breach force with direct fires. This reduces the chance of direct fire contact between an E-BFV platoon and enemy armored vehicles, but does not eliminate the requirement for engineers to be proficient in TOW gunnery. The engineer unit must have trained Bradley crews to fire the weapon system. To have trained crews capable of engaging targets with the TOW, TOW gunnery should be limited to Table VIII.

RECOMMENDATION: Do not include TOW engagements for an Engineer Table XII Platoon Qualification. Fire TOW engagements in accordance with Table VIII, FM 23-1, to ensure crews can effectively fire the TOW.

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ASSUMPTION No. 3: **Engineers do not require a Table XII defense scenario.**

DISCUSSION: In a tactical defense, engineers provide countermobility support to the maneuver unit. This mission is paramount during engagement area development. Assuming the engineer platoon provides support to several units during engagement area preparation, sufficient time is typically not available for engineers to occupy, prepare and defend a battle position. In the context of a battalion defense, a more plausible scenario involves engineers encountering enemy reconnaissance forces during obstacle emplacement. This scenario can be adapted to an offensive mission.

RECOMMENDATION: A Table XII defense scenario, given current doctrine, is unnecessary. Include a countermobility task in an offensive mission scenario. For example, task the engineer platoon to emplace a MOPMS on likely enemy counterattack route. Introduce targets that replicate contact with enemy reconnaissance elements.

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ASSUMPTION No. 4: **Engineers can execute both mobility and countermobility missions in a single offensive scenario.** This eliminates the requirement to have separate Movement-to-Contact (MTC) and Attack lanes.

DISCUSSION: An engineer Table XII qualification emphasizes engineer mission execution in a combat environment. An engineer platoon in both a movement to contact (MTC) and an attack is focused primarily on mobility support to the maneuver unit. The engineer platoon is positioned behind the lead maneuver formations and is repositioned forward to reduce lanes through obstacles. The potential for contact with the enemy is generally the same in either mission.

RECOMMENDATION: Develop a single engineer Table XII that combines target arrays from the Attack, MTC, and Defend lanes outlined in FM 23-1.

COURSE-OF-ACTION DEVELOPMENT

The process to develop an engineer Table XII gunnery derives from **FM 25-101,** ***Battle-Focused Training,*** and is similar in some respects to the Military Decision-Making Process (MDMP). Given the mission, the engineer commander determines the mission-essential tasks that an E-BFV engineer platoon must be able to perform in combat. The training objectives and specific tasks for an engineer platoon qualification come from the mission-essential tasks. The conduct of the range and the evaluation standards described in FM 23-1, Chapter 12, remain unchanged. The deviations from Table XII in FM 23-1 consist of reducing the number and type of direct fire engagements that the platoon will execute while adding engineer platoon tasks.

PROPOSED COURSE OF ACTION

The following is a possible COA for an Engineer Bradley Table XII given the following example engineer company METL:

- **Create, Proof and Mark a Lane through a Complex Obstacle.**
- **Locate and Mark a Bypass.**
- **Emplace Volcano and MOPMS.**
- **Emplace Conventional Obstacles.**
- **Conduct Survivability Operations.**
- **Conduct Tactical Movement.**
- **React to Contact.**
- **Protect the Force.**

The commander derives the critical tasks his platoons must successfully execute in combat. This produces the following course of action for an engineer Bradley Table XII qualification:

Mission: Attack.

Phases of the Operation: Six Phases.
Phase 1: Occupy an Assembly Area/Prepare for Combat.
Phase 2: Conduct Tactical Movement to an Attack Position.
Phase 3: Attack/Locate and Mark a Bypass/Emplace MOPMS.
Phase 4: Attack/Breach a Complex Obstacle with MICLIC.
Phase 5: Assault/Breach a Wire Obstacle.
Phase 6: AAR.

Bradley Gunnery Tasks:
References:
FM 71-1, ***Tank and Mechanized Infantry Company Team.***
FM 71-2, ***The Tank and Mechanized Infantry Battalion Task Force.***
FM 7-7J, ***The Mechanized Infantry Platoon and Squad (Bradley).***
ARTEP 7-8-MTP, ***MTP for the Infantry Rifle Platoon and Squad.***

- **Overwatch/support by fire.**
- **React to direct fires.**
- **React to indirect fires.**
- **React to Chemical/NBC.**
- **React to Air Attack.**

Engineer Tasks:

References:

FM 20-32, *Mine/Countermine Operations.*

FM 90-13-1, *Combined Arms Breach Operations.*

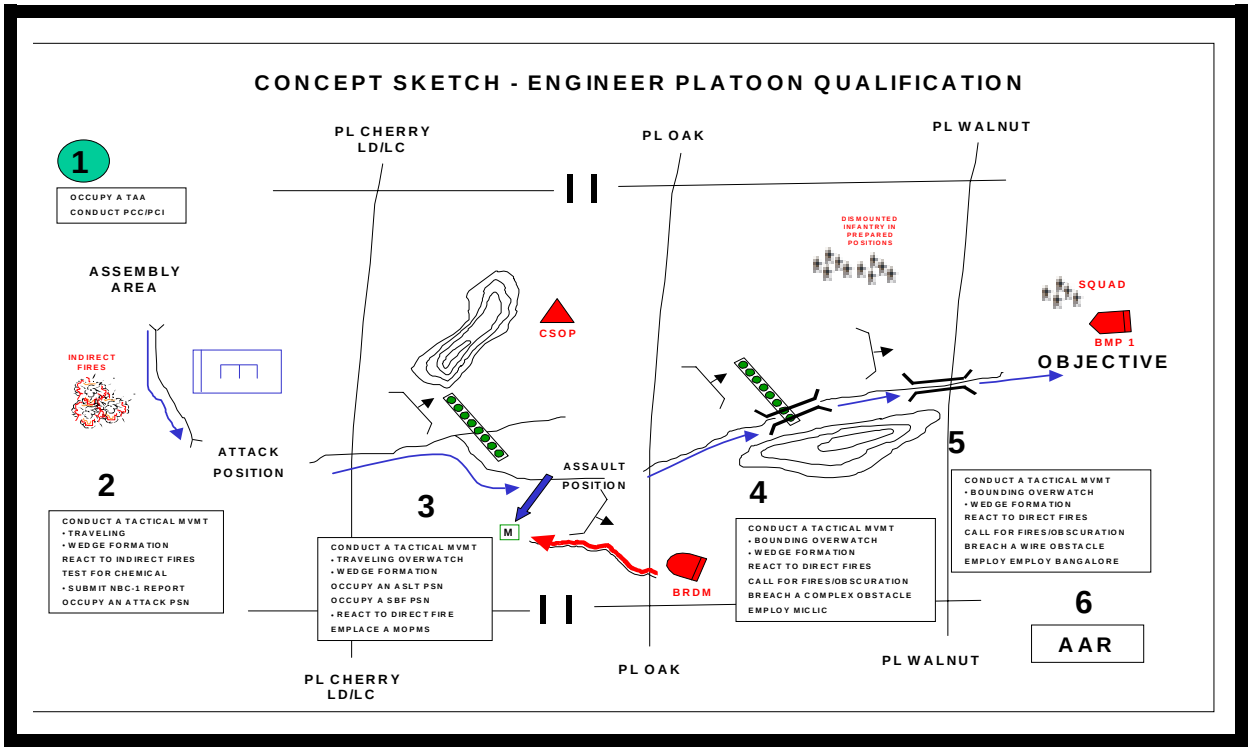
ARTEP 5-145-11-MTP, *Combat Engineer Platoon, Heavy Division.*

- **Conduct a Breach Mounted.**
- **Conduct a Breach Dismounted.**
- **Locate/Mark an Obstacle Bypass.**
  - ✔ **Employ Volcano.**
  - ✔ **Employ MOPMS.✪**

Engineer Platoon Qualification Table

	GUNNERY TASKS	CONDITION/TARGET SIMULATION	AMMUNITION	STANDARDS
Phase 1 Mvmt to TAA	None	None	None	None
Phase 2 TAA to Atk Psn	None	React to indirect fire. Fires replicated by five grenade simulators.	None	Unit executes appropriate actions on contact -- continue movement.
Phase 3 Atk Psn to Aslt Psn.	1. Engage point targets with APDS-T (A or B Sections). 2. Engage point target with APDS-T (A or B Sections).	1. Mounted element engages one stationary BRDM, frontal, 1,200-1,400M. 2. Mounted element engages one moving BRDM, 1,200-1,400M.	1. Sixteen rounds, APDS-T. 2. Twenty-four rounds, APDS-T.	1. Must hit vehicle with minimum three rds in 25 seconds. 2. Must hit vehicle with minimum three rds in 25 seconds.
Phase 4 Breach complex obst.	Engage point target with APDS-T (A or B Sections).	1. Mounted element engages dismounts in prepared psn, frontal, 1,200-1,400M. Target is identified by small arms fire 1,200M away.	Fifty rounds HEI-T.	Point target must receive 75% coverage on the target area within 45 seconds.
Phase 5 Breach wire obst.	1. Engage point target with APDS-T (A or B Sections). 2. Engage area target with COAX (A or B Sections).	1. Mounted element engages one BMP, frontal, 800-1,000M. 2. Mnted element engages dismounted infantry in a prepared psn, 800-1,000M.	1. Twenty-four rounds APDS-T. 2. Two hundred rounds 7.62.	1. Must hit vehicle with minimum three rounds in 25 seconds. 2. Must hit minimum four targets.

	ENGINEER TASKS	CONDITION/TARGET SIMULATION	MUNITIONS/ DEMOLITIONS	STANDARDS
Phase 1 Mvmt to TAA	None	None	None	None
Phase 2 TAA to Atk Psn	None	None	None	None
Phase 3 Atk Psn to Aslt Psn	1. Locate/Mark bypass. 2. Occupy an aslt position. 3. Emplace MOPMS.	1. Platoon encounters a minefield with bypass. Minefield is covered by one BRDM. 3. Trail leads into flank.	3. MOPMS trainer (replicate emplacement with grenade simulator).	3. MOPMS minefield emplaced.
Phase 4 Breach complex obst.	1. Create, proof and mark a land through a complex obstacle.	1. Plt encounters complex obst 100M in depth.	1. Inert MICLIC rocket (replicate with grenade simulators).	1. MICLIC successfully fired/lane reduced and marked.
Phase 5 Breach wire obst.	1. Create, proof and mark a lane through a wire obstacle.	1. Plt encounters linear wire obst.	1. Bangalore Torpedo Kit.	1. Lane reduced and marked.



CHAPTER 9

Casualty Evacuation (CASEVAC) for E-BFV Companies

by CPT Greg Rawlings, United States Army Engineer School

Although combat engineers and the infantry execute different tasks and missions, they share common support functions to sustain units on the battlefield. Among the most important combat service support functions on the battlefield are casualty treatment and evacuation. To avoid relearning lessons, heavy division engineers must capture the casualty evacuation and combat service support techniques developed by BFV-equipped infantry units over the years. This chapter addresses casualty treatment and evacuation (CASEVAC) observations for engineer units equipped with the E-BFV.

OBSERVATION: The ***E-BFV is virtually indistinguishable from Bradleys employed by infantry units.***

DISCUSSION: Without modification, the E-BFV looks like any other Bradley. At the NTC, E-BFVs carried externally mounted concertina wire, engineer equipment, and special engineer markings. However, when queried, OPFOR soldiers at the NTC were not able to differentiate between engineer and infantry Bradleys. As an M113-based force, combat engineers presented a minimal threat, and the OPFOR did not generally engage engineer vehicles until the engineers attempted to reduce obstacles. As a Bradley-based force, however, engineers are more likely to be engaged throughout the depth of the battlefield -- potentially increasing engineer casualties.

LESSONS:

- **The E-BFV presents a significant, direct fire threat to the enemy and will be targeted similar to other combat vehicles.** This may result in additional engineer casualties.
- **CASEVAC must be planned, disseminated and rehearsed down to each vehicle commander.**
- **Combat engineer leaders must be proficient at employing the E-BFV (i.e., tactical maneuver, direct fire planning, movement techniques) to minimize casualties.**

E-BFV with Concertina and Engineer Side Markings

OBSERVATION: Combat engineer company first sergeant is the most effective CASEVAC executor and requires an armored CASEVAC vehicle.

> "The 1SG dispatches the armored ambulance to meet and receive patients being transported by nonmedical vehicles." **--FM 5-71-2*, Armored Task Force Engineer Combat Operations***

DISCUSSION: In offensive operations, combat engineer companies increasingly execute company-level missions. The company first sergeant assumes primary responsibility for unit CASEVAC. Platoon sergeants in the E-BFV-equipped engineer company operate in Bradleys and are less able to conduct CASEVAC without directly diminishing combat power.

LESSONS:

● **The company first sergeant is the primary CASEVAC executor and requires an armored vehicle (M113) to conduct CASEVAC.**

● **The platoon sergeant coordinates and facilitates CASEVAC with the first sergeant, but continues to move with the platoon.** As the senior noncommissioned officer in the platoon, the platoon sergeant assists the platoon leader in executing the tactical mission.

● **Squad and team leaders have increased responsibility to coordinate and execute CASEVAC.**

● **The engineer company requires a comprehensive CASEVAC plan that is disseminated down to, and understood by, each vehicle commander.**

● **The engineer company CASEVAC plan must be integrated into the maneuver battalion CASEVAC plan.**

● **If the engineer company does not have an armored CASEVAC vehicle, the maneuver battalion provides it with an armored ambulance from the medical platoon.**

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OBSERVATION: The E-BFV company attached combat medics to the line platoons which limited unit flexibility for casualty treatment.

DISCUSSION: Divisional engineer companies typically receive two combat medics from the engineer battalion headquarters company. At the NTC, the E-BFV company attached the medics to the line platoons. This limited the unit's ability to triage casualties and orchestrate casualty evacuation. Additionally, as passengers in combat vehicles, the medics were as vulnerable to enemy fires as the combat engineers.

LESSONS:

● **Rely on combat lifesavers (CLSs), generally one per squad, section, or crew, to initially treat and stabilize casualties.**

● **Task the company first sergeant to manage the medics –** ***the first sergeant is responsible for getting the medics to the casualties*****.** Upon arrival, the medic relieves the CLS, completes casualty stabilization, and determines the best method for evacuation. This allows the unit to continue the mission.

● **If possible, dedicate more than one vehicle to CASEVAC.** This technique disperses the medics, allows the senior medic to establish a casualty collection point, and allows the armored CASEVAC vehicle to go forward to the point of injury to treat and evacuate casualties. Simultaneously, other vehicles can transport casualties to the battalion aid station.

E-BFV with Pearson Plow

OBSERVATION: The PSG attempted to perform CASEVAC during STX lanes.

DISCUSSION: The platoon sergeant used one of the three operational E-BFVs and the only Pearson Plow to conduct CASEVAC for his platoon. During the reduction phase, the plow was not available, and the platoon did not execute their reduction drill to standard. This also made it more difficult for the platoon leader to control his eight vehicles.

LESSON: CASEVAC must be conducted by the maneuver or engineer CO/TM.

★★★

OBSERVATION: Heavy division engineers need to capture the CASEVAC techniques developed by BFV-equipped infantry units.

DISCUSSION: Heavy division engineers transitioning to the E-BFV must apply the infantry lessons in casualty treatment and CASEVAC techniques. A summary of these lessons and the lessons captured at the NTC include the following:

LESSONS:

- **E-BFV-equipped engineers are more likely to draw enemy fires.**
- **The engineer CASEVAC planned must be integrated in the battalion plan.**
- **The engineer CASEVAC must be disseminated and rehearsed.**
- **The company first sergeant is the primary CASEVAC executor.**
- **The company first sergeant requires an armored vehicle to execute CASEVAC.**
- **Platoon sergeants fight the tactical fight with the platoons.**
- **The first sergeant is responsible to ensure the medics get to the casualties.**

Effective use of the techniques presented here will enable combat engineers to accomplish CASEVAC and improve the chances for wounded soldiers to survive.✪

APPENDIX A
COLLECTION PLAN, NTC Rotation No. 98-10

Issues/Sub-Issues/Questions – Engineer-Bradley Fighting Vehicle (E-BFV)

I. Issue: *Tactical Employment of the E-BFV.*

Sub-issue: Movement to Contact.

1. How did the maneuver TF task-organize and include the EN company?
2. How did the EN company task-organize?
3. How did the EN company support the reconnaissance effort?
4. Were the EN utilized and employed as a maneuver asset by the maneuver TF HQ?
5. How were EN integrated into the maneuver scheme?
6. Obstacle planning?
7. Mobility planning and tasks?

Sub-Issue: Deliberate Attack/Breach.

1. How did the maneuver TF task-organize and include the EN company?
2. How did the EN company task-organize?
3. How did the EN company support the reconnaissance effort?
4. Were the EN utilized and employed as a maneuver asset by the maneuver TF HQ?
5. How were EN integrated into the maneuver scheme?
6. Obstacle planning?
7. Mobility planning and tasks?
8. Impact on breaching fundamentals?
9. Breach/assault/support task organization?
10. Breach force C^2?
11. Integration of M113 and E-BFV?

Sub-Issue: Defense.

1. Engineer countermobility?
2. Maneuver EN support of countermobility effort?
3. Engineer employment upon completion of countermobility effort (MBA)?
4. Impact on Class IV and Class V operations?
5. Is Volcano used as directed obstacle?
6. Volcano security?
7. What additional tasks does the TF assign engineer company?
8. Impact on engineer effort?
9. Safety consideration/reduction measures?
10. Fighting as engineers versus fighting as infantrymen?
    - ➤ Few infantry dismounts?
    - ➤ One less company – Delta company?

Sub-issue: Actions on Contact.

1. Visual contact.
2. Direct contact.
3. Indirect contact.
4. Aerial contact.
5. NBC.
6. Obstacle.
7. IEW.

II. Issue: *Manning.*

Sub-Issue: Direct and Lead Soldiers.

1. What is the role of platoon sergeant in the fight and what communication nets does he monitor?
2. Is the platoon sergeant a logistician or a warfighter?
3. What is the role of the squad leader?
4. What is the composition of the engineer dismount element?
5. Assault and obstacle platoons: roles of platoon sergeant and platoon leader?
6. Location of medics?
7. What is the appropriate squad size and composition of the platoon?
8. What is the impact of smaller squad size?

Sub-Issue: Battle Drills.

1. Changes to ROW minefield drills?
2. Changes to reduction drills?
3. Changes to marking drills?

III. Issue: *Equipment.*

Sub-Issue: Load Plans.

1. What is the standard load plan?
2. What is required to secure engineer equipment?
3. Sets, Kits, and Outfits (SKOs) requirements?
4. Compare and contrast carrying capacity of M113 vs E-BFV
   - ➤ Internal.
   - ➤ External.
5. What are the modification work order (MWO) requirements?
6. What TTPs did the unit adopt to fix shortfalls?

Sub-Issue: Surface Mine Plow.

1. How did the unit employ the plow and was it successful?
2. What is the mobility effect on the vehicle?
3. What is the Basis of Issue Plan (BOIP)?
4. What is the operational/readiness rate?
5. How long does it take to put on and take off?
6. How much does it degrade the speed of the vehicle?
7. What are the potential uses of the Mine Plow (i.e., route proofing, rubble, riot control, Bosnia)?

Sub-Issue: Weapons.

1. Did the unit employ TOW? BDA?
2. Did the unit employ the main 25mm gun? BDA?

Sub-Issue: Access/Egress.

1. What is the effect on battle drills?
2. What is the effect on crew drills?
   - ➤ Safety/Fire.
   - ➤ Rollover.

Sub-Issue: Force Protection.

1. Is the M113 more survivable than M113?
2. Why is the E-BFV better?
   - ➤ Ability to stay with maneuver force.
   - ➤ Speed.
   - ➤ Fire.
   - ➤ Armor.

IV. Issue: *CSS.*

Sub-Issue: CASEVAC.

1. Who executes engineer CASEVAC in a E-BFV-equipped company?
2. Where do the medics ride?
3. Did engineers with the E-BFV have more or less casualties, proportionally, than the M113? Rationale?
4. What new TTPs did medics incorporate (e.g., TTP to get casualty out of turret)?

Sub-Issue: Classes of Supply.

1. What are shortfalls in LOGPACs?
2. What were changes to company trains?
3. What is the omposition of company and battalion trains?
4. What additional manning is required?
   - ➤ Turret mechanic.
   - ➤ Armorer.
   - ➤ TOW sight.
   - ➤ Support platoon.

Sub-Issue: Maintenance.

1. What were the changes that took place during unit maintenance collection point (UMCP) operations?
2. Operational/readiness rate comparing M113 and E-BFV?
3. Recovery operations (Force XXI-BSA)?

Sub-Issue: Support Platoon.

1. Is its composition adequate?
2. Can it conduct LOGPAC operations?

V. Issue: *Training.*

Sub-Issue: Transition Trainup.

1. What specific training events did the unit execute to prepare for NTC?
2. Did the unit reduce training on engineer-specific missions to train up on E-BFV?
3. What is the long-term impact on readiness?
4. What is the "standard" for being "combat ready?"
5. How much time does it take to get "combat ready" with the new E-BFV?✪